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ERRATA AND CORRIGENDA

Page 78.	Line 38 of column 2. Read "LINEDALE for "LINDALE".
Page 92.	Line 18 of column 2. Read "sucroglyceride" for "sucroclyceride".
Page 111.	Line 23 of column 2. Read "Argentina" for "Mexico".
Page 120.	Line 31 of column 1. Read "R. PIECK" for P. PIECK".
Page 172	Line 19 of column 1. Read "1968" for "1966".
Page 213	Line 35 of column 2. Read "Clarifier investigations. I. Capacity of the A.T.V. clarifier at Isis mill. II. Capacity of the A.T.V. clarifier at Fairymead mill".
Page 285.	Line 30 of column 1. Read "which" for "with".
Page 309.	Line 44 of column 1. Read "NAGORNAYA" for "NAGOR-".

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SOMMAIRES : ZUSAMMENFASSUNGEN : SUMARIOS

L'effet de réglage de moulins sur les pressions des coussinets dans un moulin à trois cylindres. J. YOUNGER. p. 3–5

On a examiné dans six cas la distribution des forces dans un moulin à trois cylindres au moment avant le cylindre supérieur se met à s'élever. Les deux cas extrèmes sont (i) ou le cylindre d'entrée ne travaille pas d'une manière significative, et (ii) ou le travail est également divisé entre les cylindres d'entrée et de sortie. Les autres cas se trouvent entre ces extrèmes. Les résultats montrent comment les pressions sur les coussinets peuvent croisser au-dessus des valeurs d'opération sûres à des taux d'alimentation bas et aussi empêcher le mouvement libre du cylindre supérieur.

* * *

Les betteraves sucrières au West Pakistan. p. 6

C'est sommaire de cette partie du rapport annuel du Ayub Agricultural Research Institute à Lyallpur, au West Pakistan, qui traite d'essais sur une petite échelle ayant pour but l'examination de la possibilité de la cultivation de betteraves sucrières.

* * *

Les installations pour la manutention du sucre en vrac à Lourenço Marques. T. L. SIMMS. p. 6

On donne un rapport bref sur la manutention du sucre en vrac aux installations à Lourenço Marques (Mozambique), qui comprennent un hangar dont la capacité de stockage totale est 80.000 tonnes.

* * *

Les constituants à surface active dans la cristallisation du sucre de betteraves. 1-ère partie. J. F. T. OLDFIELD et J. V. DUTTON. p. 7–9

Dans la première partie de cette investigation qui a pour but l'isolation et l'identification des composants de significance majeure dans la formation d'écume des sucres, on discute des essais sur le rapport entre le flocon et l'index de formation d'écume, l'extraction par charbon actif de l'agent causatif de l'écume, l'isolation de l'agent par acide acétique, et l'épuration par le fractionnement sur "Sephadex G-25".

* * *

Les effets de surchauffage sur la cristallisation du saccharose sous les conditions d'ébullition. 1-ère partie. M. C. BENNETT et Y. L. FENTIMAN. p. 9–13

On donne des détails d'essais avec un expérimental appareil de cristallisation opérant à des températures, pressions et sursaturations constantes. On a trouvé que la solubilité du saccharose sous des conditions d'ébullition est à peu près 1,5 g saccharose/100 g solution plus grande que des valeurs publiées pour l'équilibre non-bouillonant. Les auteurs montrent que celui-ci est causé du surchauffage à la surface de chauffage de l'appareil.

Die Einwirkung von Mühleneinstellungen auf die Lagerdrücke bei einer Dreiwalzenmühle. J. YOUNGER. S. 3–5

Man hat die Verteilung von Kräften bei einer Dreiwalzenmühle, gerade bevor die Obenwalze zu steigen beginnt, in sechs Fällen studiert. Die zwei äussersten Fälle sind: (i) wo die Eintrittswalze keine bedeutsame Arbeit tut, und (ii) wo die Arbeitsladung gleichmässig zwischen den Eintritts- und Ausgangs-Walzen verteilt ist. Die anderen vier Fälle liegen zwischen diesen Aussersten. Die Ergebnisse zeigen, wie die Lagerdrücke bis über sichere Betriebswerte bei niederen Speisemengen steigen können und auch die freie Bewegung der Obenwalze hindern.

* * *

Zuckerrübe in West-Pakistan. S. 6

Dies ist eine Zussamenfassung eines Teils des Jahresberichts des Ayub Agricultural Research Institute in Lyallpur, West-Pakistan, über einige Kleinversuche, die durchgeführt wurden, um die Möglichkeit des Anbaus von Zuckerrüben zu verwerten.

* * *

Die Zuckerverladeanlage in Lourenço Marques. T. L. SIMMS. S. 6

Man gibt eine kurze Bericht über die Behandlung von losem Zucker an der Verladeanlage in Lourenço Marques, in Portugiesisch-Ostafrika (Mozambique), wo das Lagerhaus ein Lagerungskapazität von 80.000 Tonnen Zucker hat.

* * *

Oberflächenaktive Bestandteile in der Rübenzuckerkristallisation. Teil I. J. F. T. OLDFIELD und J. V. DUTTON. S. 7–9

Im ersten Teil dieser Untersuchung, um die Bestandteile von grösserer Bedeutung im Schaumen von Zuckern zu isolieren und identifizieren, geben die Verfasser Informationen über Versuche über die Beziehung zwischen den Flocken und dem Schaumensindex, die Extraktion durch Aktivkohle des schaumerzeugenden Mittels, seine Isolierung mittels Essigsäure, und seine Reinigung durch die Fraktionierung auf "Sephadex G-25".

* * *

Die Einwirkungen der Uberhitzung auf die Kristallisation der Saccharose unter siedenden Verhältnissen. Teil I. M. C. BENNETT und Y. L. FENTIMAN. S. 9–13

Man berichtet über Versuche mit einer Versuchskristallisationsapparat, der bei stetigen Temperatur, Druck und Übersättigung arbeitet. Es wurde gefunden, dass unter siedenden Verhältnissen die Löslichkeit der Saccharose um etwa 1,5 g Saccharose/100 g Lösung höher als veröffentlichte Werte für nichtsiedendes Gleichgewicht war. Es wird gezeigt, dass dies durch die Uberhitzung an der Heizfläche des Apparats verursachtet wird.

El efecto de las aberturas sobre las presiones sobre las chumaceras de un molino de tres mazas. J. YOUNGER. Pág. 3–5

La repartición de fuerzas en un molino de tres mazas cuando la maza superior esta para levantarse se examina en seis casos. Los dos casos extremos son (i) cuando la maza de alimentación no hace trabajo significante, y (ii) cuando la carga se repartica igualmente entre las mazas de alimentación y de bagazo. Los otros cuatro casos se colocan entre estos extremos. Los resultados, ilustran como las presiones sobre las chumaceras pueden levantarse encima las niveles de trabajo segura a grados bajos de alimentación y también impiden flotación libre.

* * *

La remolacha en Pakistan Occidental. Pág. 6

Esto es un sumario de una parte del Reporte Anual del Ayub Agricultural Research Institute de Lyallpur, en Pakistan Occidental, que trata de experimentos de pequeña-escala hecho para examinar la posibilidad de cultivación de remolacha azucarera.

* * *

La terminal a granel de Lourenço Marques. T. L. SIMMS. Pág. 6

Se presenta una cuenta breve del manejo de azúcar a granel a la terminal de Lourenco Marques, en Mozambique, a donde se ha construido un almacén con una capacidad de 80,000 toneladas.

* * *

Constituentes activos superficialmente en cristalización de azúcar de remolacha. Parte I. J. F. T. OLDFIELD y J. V. DUTTON. Pág. 7–9

En la primera parte de esta investigación para aislar y identificar componentes de mayor importancia en la formación de espuma por azucares, se presentan detalles de experimentos sobre la relación entre flóculos y indice de espuma, la extracción por carbón activo del agente que causa el espuma, recuperación de esto agente con ácido acético y su purificación por fraccionación con "Sephadex G-25".

* * *

Efectos de supercalefacción sobre cristalización de sacarosa en condiciones de ebulición. Parte I. M. C. BENNETT y Y. L. FENTIMAN. Pág. 9–13

Se presentan detalles de ensayos con un vaso para cristalización experimental que opera sobre temperatura, presión y supersaturación constante. Los autores han descubrido que la solubilidad de la sacarosa sobre condiciones de ebulición esta cerca de 1,5 g por 100 g de solución más grande que valores publicados para equilibrio no-ebuliente. Han demostrado que esto fenómeno es el resultado de supercalefacción a la superficie del vaso.

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La cultivation mécanique de la canne en Australie. p. 35–36

On décrit un dispositif pour la défeuillaison de la canne à la main, qui permet d'accroître le nombre de cannes défeuillées par 100–200% en comparaison avec des moyens conventionnels, et un mécanisme, tiré par tracteur, pour le nivellement du terrain. On mentionne brièvement des autres dispositifs mécaniques pour application aux champs de cannes.

* * *

Les effets du surchauffage sur la cristallisation du saccharose sous les conditions d'ébullition. 2-éme partie. M. C. BENNETT et Y. L. FENTIMAN. p. 36–39

Les auteurs définissent les paramètres principaux concernant le mesurage des effets du surchauffage, et ils décrivent des essais pour déterminer l'effet du surchauffage sur la sursaturation. Ils ont déterminé des vitesses de cristallisation sous les conditions d'ébullition et ont trouvé que la constante à 73,0°C s'accord avec la valeur obtenue par SMYTHE.

* * *

Les constituants à surface active dans la cristallisation du sucre de betteraves. 2-ème partie. J. F. T. OLDFIELD et J. V. DUTTON. p. 40–43

On a trouvé que les peptides de poids moléculaire élevé dans un extrait d'un sucre écumant amènent à la formation d'écume. On n'a pas constaté l'identité d'un composant écumant de poids moléculaire bas dans l'extrait. Les auteurs ont mesuré les concentrations des peptides dans des extraits de sucre blanc de betteraves et ont trouvé que, généralement, les concentrations plus élévées de peptides étaient accompagnées des indices de formation d'écume plus élévés, bien qu'à des concentrations plus basses il n'y ait pas de rapport direct entre la concentration de peptide et l'indice de formation d'écume.

* * *

L'économique de l'irrigation supplémentaire de la canne à sucre. D. B. CAMPBELL p. 43–45

L'auteur considère les avantages économiques de l'application de l'irrigation supplémentaire à la canne à sucre dans cettes parties du monde ou on peut cultiver la canne sans l'irrigation, et discute le calcul des quantités d'eau nécessaires.

Der mechanischer Rohranbau in Australien. S. 35–36

Man beschreibt eine Handvorrichtung für die Entblätterung von Zuckerrohr, mit welcher man 100–200% mehr Rohr als durch übliche Methoden entblättern kann. Eine von Traktor gezogene Vorrichtung für die Nievellierung des Bodens wird auch beschrieben Andere auf Rohrfeldern anzuwendende, mechanische Vorrichtungen werden auch in kurzem erwähnt.

* * *

Die Einwirkungen der Uberhitzung auf die Kristallisation der Saccharose unter siedenden Verhältnissen. Teil 2. M. C. BENNETT und Y. L. FENTIMAN. S. 36–39

Die Verfasser definieren die Hauptparameter in der Messung des Uberhitzungseffekts und beschreiben Versuche, um die Einwirkung der Uberhitzung auf die Übersättigung zu bestimmen. Man hat Kristallisationsgeschwindigkeiten unter siedenden Verhältnissen bestimmt, wobei sie eine Übereinstimmung zwischen der Konstante bei 73,0°C und dem von SMYTHE erhaltenen Wert gefunden haben.

* * *

Oberflächenaktive Bestandteile in der Rübenzuckerkristallisation. Teil 2. J. F. T. OLDFIELD und J. V. DUTTON. S. 40–43

Die Verfasser haben gefunden, dass hochmolekulare Peptide in einem, aus einem schäumenden Zucker stammenden, Extrakt das Schäumen verursachen. Es war nicht möglich, einen niedermolekularen, schäumenden Komponent im Extrakt zu identifizieren. Die Peptidkonzentrationen in aus Rübenweisszuckern stammenden Extrakten wurden gemessen, wobei man fand, dass im allgemeinen die höheren Peptidkonzentrationen von höheren Schaumindexen begleitet wurden, obgleich bei niedrigern Konzentrationen gibt es keine Beziehung zwischen der Peptidkonzentration und dem Schaumindex.

* * *

Die Okonomie von nachträglicher Bewässerung des Zuckerrohrs. D. B. CAMPBELL. S. 43–45

Der Verfasser betrachtet die ökonomische Vorteile der Anwendung von "nachträglicher" Bewässerung des Zuckerrohrs in jenen Ländern, wo man das Rohr nicht ohne die Bewässerung anbauen kann, und bespricht die Berechnung des Wasserbedarfs.

Cultivo mecanizado de caña en Australia. Pág. 35–36

Se presenta una descripción de un deshojador a mano que permite la deshojación de 100–200% más caña que por medios convencionales. También se describe un equipo, tirado por tractor, para allenar el terreno. Se mencionan brevemente otros equipos mecánicos para uso en campos cañeros.

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Efectos de supercalefacción sobre cristalización de sacarosa en condiciones de ebulición. Parte II. M. C. BENNETT y Y. L. FENTIMAN. Pág. 36–39

Se definen los parametros principales que se conciernen en la medida de los efectos de supercalefacción, y experimentos para determinar el efecto de supercalefacción, y experimentos para determinar el efecto de supercalefacción sobre la supersaturación se describen. Las velocidades de cristalización se han determinado en condiciones de ebulición, y los autores han demostrado que el constante medido a 73,0°C concorda con el valor obtenido por SMYTHE.

* * *

Constituentes activos superficialmente en cristalización de azúcar de remolacha. Parte II. J. F. T. OLDFIELD y J. V. DUTTON. Pág. 40–43

Peptidos de alto peso molecular en un extracto desde un azúcar espumoso se han demostrado capaz de causar formación de espuma. Un componente de bajo peso molecular del extracto, también capaz de causar espuma, no se ha identificado. Los autores han medido las concentraciones de peptidos en extractos desde azucares blancos remolacheros y han descubrido que, generalmente, altos niveles de peptidos se acompañan de altos indices de formación de espuma. No obstante, a niveles más bajos, no hay ningún relación directa entre concentración de peptido y indice de formación de espuma.

* * *

Los económicos de regadío suplemental en caña de azúcar. D. B. CAMPBELL. Pág. 43–45

Se discutieren las ventajas económicas del uso de regadío suplemental para caña en las partes del mundo donde se puede cultivar sin regadío, asi como la calculación de exigencias de agua.

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L'adsorption de matière colorante sur des résines décolorantes. F. SCHNEIDER, D. SCHLIEPHAKE et J. PALEOS. p. 67–69, 77

On a étudié le mécanisme de l'adsorption de matière colorante sur des échangeurs d'ions décolorants de structures différentes en employant des solutions de sucre brut et une fraction de l'acide fuscacinique. Les processus pendant le chargement et la régénération de la résine sont montrés à l'aide de particules coupées des résines; on peut voir comment les capacités d'adsorption de la matière colorante rapportées à la surface de la résine se rapprochent les unes des autres avec augmentation du nombre de cycles, ce qu'indique que la zone de l'absorption active consiste en une couche sphérique près de la surface de la particule de la résine.

* * *

Utilisation des ultra-sons pour le contrôle de la cristallisation. D. AHARI, J. GENOTELLE, F. HEITZ et J. M. VICAIGNE. p. 71–75

On a examiné la signification des mesures viscosimétriques ultra-sonores en fonction des paramètres fondamentaux de la cristallisation, en employant des solutions sucrées pures et impures. Les résultats, qui sont pratiquement indépendantes de la température de la cuite (70 à 90°C), montrent que l'addition de cristaux aux solutions influence la mesure, bien que dans le cas du viscosimètre ultra-sonore cette influence ne commence à se manifester qu'au-delà d'environ 25% de cristaux, et est d'autant plus faible que la dimension des cristaux est plus élevée. L'appareil a été utilisé pour le contrôle de la cristallisation industrielle en appareil à cuire.

* * *

Recherche aux Etats-Unis sur la diminution du rendement des variétés de canne. R. E. COLEMAN. p. 75–77

Des aspects variés du problème de la diminution du rendement des variétés de canne sont les sujets d'études aux Etats-Unis. L'auteur discute la nature de cettes recherches ainsi que quelques conclusions.

Farbstoffadsorption an Entfärbungsharzen. F. SCHNEIDER, D. SCHLIEPHAKE und J. PALEOS. S. 67–69, 77

Es wurde der Mechanismus von Farbstoffadsorption an Entfärbungsharzen unterschiedlicher Struktur mittels technischer Rohzuckerlösungen auch einer Fuscazinsäure-Fraktion studiert. Die Vorgänge bei Beladung und Regenerierung des Harzes werden an geschnittenen Harzkornern nachgewiesen, wobei man zeigt, wie sich die auf die Oberfläche bezogenen Farbstoffadsorptionskapazitäten mit zunehmender Zyklenzahl annähern; dies zeigt, dass der aktive Adsorptionsanteil aus einer spherischen Kugelschale dicht an der Oberfläche des Harzkorns besteht.

* * *

Anwendung von Ultraschallwellen für die Kontrolle der Kristallisation. D. AHARI, J. GENOTELLE, F. HEITZ und J. M. VICAIGNE. S. 71–75

Die Verfasser haben die Bedeutung von Ultraschallviskositätsmessungen in Verbindung mit den basischen Parametern der Kristallisation mittels reiner und unreiner Zuckerlösungen studiert. Die Ergebnisse, die praktische unabhängig von Kochtemperatur (70 bis 90°C) waren, zeigen, wie der Zusatz von Kristallen in die Lösungen die Messung abänderten, obgleich diese Einwirkung bei einer Kristallmenge von 25% oder weniger nur sehr klein war. Der Einfluss der Kristalle nimmt mit Zunahme ihrer Dimensionen ab. Der Apparat ist für die Kontrolle von industrieller Kristallisation in einem Kochapparat angewendet worden.

* * *

Forschungen in den Vereinigten Staaten über die Verminderung des Ertrags von Rohrsorten. R. E. COLEMAN. S. 75–77

In den Vereinigten Staaten werden verschiedene Faktoren des Problems von Verminderung des Ertrags von Rohrsorten studiert. In diesem Aufsatz bespricht man diese Forschungsarbeit wie auch einige Ergebnisse.

Adsorción de material colorante sobre resinas descolorizantes. F. SCHNEIDER, D. SCHLIEPHAKE y J. PALEOS. Pág. 67–69, 77

Los autores han estudiado el mecanismo de adsorción de material colorante sobre resinas descolorizantes de varias estructuras, empleando soluciones técnicas de azúcar crudo y de un fracción de ácido fuscazinico. Demuestran los procesos que ocurren mientras la carga y la regeneración de la resina con el ayuda de partículas seccionadas, de que es posible indicar que las capacidades para adsorción de los materiales colorantes, relativo al área superficial de la resina, convienen aproximativamente con aumento en el número de ciclos. Esto indica que la zona activa de adsorción es una capa esférica cerca de la superficie de la partícula de resina.

* * *

Empleo de equipo ultrasónico para el control de cristalización. D. AHARI, J. GENOTELLE, F. HEITZ y J. M. VICAIGNE. Pág. 71–75

El importancia de medidas de viscosidad, por técnicas ultrasónicas, como función de los parámetros básicos de cristalización, se ha estudiado con el uso de soluciones de azúcar puro e impuro. Los resultados, casi independiente de la temperatura de ebulición (70–90°C), demuestran que las medidas se cambian con el adición de cristales, aunque el contenido de cristales afecta el viscómetro ultrasónico solamente ligeramente a un contenido de 25% o menos. El efecto de los cristales se disminuye con aumento de su tamaño. El equipo se ha utilizado para el control de cocción en un tacho industrial.

* * *

Investigaciones en los E.U.A. sobre la disminución de rendimiento de variedades de caña. R. E. COLEMAN. Pág. 75–77

Un los E.U.A. se estudián varios aspectos de la problema de disminución de rendimiento de variedades de caña, y la naturaleza de esta obra y un número de descubrimientos se discutieron.

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Changements de la vitesse de la cristallisation en fonction de la quantité des substances colorées dans la solution. H. ZAORSKA. p. 99–103

Des substances colorées contenues dans le sucre de basse pureté ont été adsorbées sur le charbon actif et ensuite extraites afin de les ajouter en quantités diverses à des solutions du saccharose pur et à des liqueurs de haute pureté. Les substances colorées a réduit la vitesse de la cristallisation dans les solutions, mais l'effet refrénant a été plus petit à mesure que les additions de la couleur a été augmentées. L'effet des substances colorées a été plus grand avec les liqueurs de plus haute pureté que dans le cas de celles d'une plus basse pureté.

* * *

Le refroidissement de masses cuites dans les cristalliseurs discontinus à refroidissement à eau. H. J. SPOELSTRA et D. HOKS. p. 103–107

On présente une formule d'approximation simplifiée pour le calcul de la chute de température d'une masse cuite dans un cristalliseur discontinu à refroidissement à eau. Cette formule, en combinaison avec une formule antécédente pour refroidissement à air naturel, donne la chute de température totale. Des essais laboratoires et dans la sucrerie, dans lesquels on a varié l'écoulement de l'eau, ont donné des résultats qui sont présentés sur une seule courbe dans un graphique. Bien que la courbe soit approximative, elle est cependant utile pour l'estimation de la température d'une masse cuite avec une précision acceptable, et on donne un calcul typique comme exemple.

* * *

Des méthodes de l'estimation de l'acide aconitique. S. C. GUPTA et U. CHETAL. p. 107–110

Une méthode de carboxylation pour l'estimation de la teneur en acide aconitique dans les mélasses, bien que plus simple que la précise méthode polarographique, a donnée des résultats avec une erreur jusqu'à 40–60%. Par l'addition de l'acétate de plomb à pH 11 au lieu de pH 6·5, la précipitation de l'aconitate a été complete et l'erreur a été réduite à 2%.

Geschwindigkeitsänderungen der Saccharosekristallisation in Abhängigkeit von der Farbstoffmenge in der Lösung. H. ZAORSKA. S. 99–103

Es wurden Farbstoffe aus Zucker von niedriger Reinheit auf Aktivkohle adsorbiert. Nach der Extraktion, wurden die Farbstoffe in verschiedenen Mengen zu reinen Saccharoselösungen und Klären von hoher Reinheit hinzugegeben. Die Farbstoffe verminderten die Kristallisationsgeschwindigkeit in den Lösungen, obgleich der Hemmungseffekt geringer mit steigendern Farbstoffmengen war. Die Einwirkung der Farbstoffe war grösser mit Klären von hoher Reinheit als mit jenen von niedrigerer Reinheit.

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Die Kühlung von Füllmassen in diskontinuierlichen, wassergekühlten Kristallisatoren. H. J. SPOELSTRA und D. HOKS. S. 103–107

Eine simplifizierte Näherungsformel für die Berechnung von Temperaturabfall in einer Füllmasse in einem diskontinuierlichen, wassergekühlten Kristallisator wird gegeben. Diese Formel, in Verbindung mit einer früheren Formel für die Kühlung mit natürlicher Luft, gibt die Gesamttemperaturabfall. Betriebs- und Laborversuche, in den das Wasserfliessen variiert wurde, haben Ergebnisse gegeben, welche auf einer einzigen Kurve in einem Diagramm dargestellt werden. Obgleich die Kurve nur annähernd ist, ist sie nützlich für die Berechnung von Füllmassetemperatur mit passender Genauigkeit, und man gibt eine typische Berechnung als Beispiel.

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Methoden für die Berechnung von Akonitinsäure. S. C. GUPTA and U. CHETAL. S. 107–110

Eine Dekarboxylisierungsmethode für die Berechnung von Akonitinsäure in Melassen, obgleich mehr einfach als die genauige, polarographische Methode, hat Ergebnisse mit einem Fehler bis zu 40–60% gegeben. Durch die Hinzufügung des Bleiazatats bei pH 11 statt pH 6·5, war die Akonitatsniederschlagung vollständig, und der Fehler wurde bis zu 2% vermindert.

Cambios en la velocidad de cristalización de sacarosa como función de la cantidad de material colorante en la solución. H. ZAORSKA. Pág. 99–103

Material colorante de azúcar de bajo grado se adsorba sobre carbón activo y después se extrae para adición en varias proporciones a soluciones de sacarosa pura y a licores de alta pureza. El material colorante disminuó la velocidad de cristalización de las soluciones pero el efecto de reducción estuvó menor para incrementos adicionales de color. El efecto del material colorante estuvó mayor con licores de alta pureza que con estos de más bajo pureza.

* * *

El enfriamiento de masas cocidas en cristalizadores no-continuos enfriado con agua. H. J. SPOELSTRA y D. HOKS. Pág. 103–107

Una fórmula simplificado de aproximación se presenta para calcular la caída de temperatura de una masa cocida en un cristalizador no-continuo enfriado con agua. Esta fórmula, en combinación con un otra dada previamente, de la caída total de temperatura. Ensayos en una fábrica y pruebos en el laboratorio en que el flujo de agua se variaba dieron resultas que se presentan en la misma curva de un gráfico. Mientras la curva es aproximativa, sin embargo es util para predecir la temperature de una masa cocida con exactitud aceptable, y un cálculo típico se presenta como ejemplo.

* * *

Métodos para estimación de ácido aconitico. S. C. GUPTA y U. CHETAL. Pág. 107–110

Un método de descarboxilación para estimación de ácido aconitico en melaza, mientras más sencillo que el exacto método polarográfico, dió resultas con error tan grande como 40–60%. Por adición del acetato de plomo a pH 11 en lugar de pH 6·5, precipitación del aconitato estuvó completa y el error se reduzca al 2%.

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L'influence de non-sucres sur la cinétique de la cristallisation. D. SCHLIEPHAKE, E. ZEICHNER, F. A. ORLOWSKI et F. SCHNEIDER. p. 131–134

On examine l'effet de non-sucres sur la cristallisation du saccharose sous la forme de leur influence sur le rapport de leurs résistances au transfert de molécules at à l'incorporation de molécules dans la surface d'un cristal Les non-sucres ont un effet inhibitoire, considérable sur la réaction à la surface, et aux températures plus basses l'adsorption de substances colorantes et de substances de poids moléculaires élevés est plus dominant que l'adsorption de sels. Des résultats obtenus par l'analyse statistique de la distribution de la grandeur des cristaux a-t-on confirmé par des expériences de cristallisation dans des colonnes.

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La carbonatation de liqueur. 3-ème partie. Méthodes laboratoires pour la comparaison de la qualité d'échantillons de liqueur ou de chaux. M. C. BENNETT et S. D. GARDINER. p. 135–137

Dans la première section de cet article les auteurs décrivent une station de carbonatation laboratoire et donnent des détails de la méthode expérimentale employée pour la carbonatation dans une seule chaudière sous les conditions identiques à celles-ci dans une raffinerie. Les mesures de la filtrabilité de la liqueur saturée sont donc convenables pour la prédiction du comportement d'un sucre brut, de la qualité de chaux d'une nouvelle source, ou du changement d'un variable de procédé, etc.

* * *

L'emploi de filtres-épaississeurs pour la première carbonatation dans les sucreries danoises. 1-ère partie. R. F. MADSEN. p. 137–140

On esquisse l'histoire de l'application de filtres à poches pour la première carbonatation dans la société DDS et donne les détails de l'application d'une station à filtres automatiques installée dans 1965 et 1966 dans deux sucreries danoises pour le jus de première carbonatation et qui se base sur des essais initiaux de 1963–64.

Der Einfluss von Nichtzuckerstoffen auf die Kinetik der Kristallisation. D. SCHLIEPHAKE, E. ZEICHNER, F. A. ORLOWSKI und F. SCHNEIDER. S. 131–134

Man hat den Einfluss von Nichtzuckerstoffen auf die Saccharose-Kristallisation in der Form ihrer Einwirkung auf das Verhältnis ihrer Widerstände der Molekulübertragung und der Molekuleinschliessung in die Kristalloberfläche untersucht. Nichtzuckerstoffe haben einen beträchtlichen Hemmungseinfluss auf die Oberflächenreaktion, und bei niederen Temperaturen ist die Adsorption von Farbstoffen und von höheren Molekularstoffen mehr emporragend als die Adsorption von Salzen. Die durch statistische Analyse von Korngrössenverteilung erhaltenen Ergebnisse werden an Hand Kristallisationsversuchen in Kolonnen bestätigt.

* * *

Karbonatation von Kläre. Teil 3. Labormethoden für den Vergleich der Qualität von Klären- oder Kalk-Proben. M. C. BENNETT und S. D. GARDINER. S. 135–137

In der ersten Sektion dieses Aufsatzes beschreiben die Verfasser eine Laborkarbonatationsanlage auch die für die Karbonatation in nur einem Kessel angewandte Versuchmethode, die unter den gleichen Bedingungen als in der Raffinerie durchgeführt wird. Daher eignen sich die Messungen der Filtrabilität der saturierten Kläre für die Vorhersagung des Verhaltens eines Rohzuckers, der Kalkqualität einer neuen Quelle, oder der Veränderung einer Verfahrensvariable, usw.

* * *

Anwendung von eindickenden Filtern für erste Karbonatation in den dänischen Zuckerfabriken. Teil 1. R. F. MADSEN. S. 137–140

Der Verfasser umreisst die Geschichte von Beutelfilter-Anwendung für erste Karbonatation in den dänischen Zuckerfabriken und gibt die Einzelheiten der Anwendung einer Station von automatischen Filtern, die in 1965 und 1966, auf der Base von ursprünglichen Versuchen in 1963–1964, in zwei dänischen Zuckerfabriken für ersten Karbonatationssaft eingerichtet wurden.

La influencia de no-azúcares sobre las cinéticas de cristalización. D. SCHLIEPHAKE, E. ZEICHNER, F. A. ORLOWSKI y F. SCHNEIDER. *Pág.* 131–134

El efecto de no-azúcares sobre cristalización de sacarosa se examina en términos de su influencia sobre la relación entre las resistencias a transferencia molecular y a incorporación molecular en la superficie del cristal. No-azúcares tienen un efecto relativamente importante de inhibición de la reacción a la superficie, y a temperaturas relativamente baja el adsorción de materiales colorante y de substancias de alto peso molecular es más dominante que el adsorción de sales. Resultas obtenido por análisis estatistical de distribuciones de tamaño de grano se confirman por experimentos en que cristalización se conduce en columnas.

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Carbonatación de licor. Parte III. Procedimientos de laboratorio para comparar la calidad de muestras de licor o cal. M. C. BENNETT y S. D. GARDINER. *Pág.* 135–137

En la primera sección de este artículo, los autores describen un aparato de laboratorio y presentan detalles del procedimiento experimental que emplean para un carbonatación a solo tanque que da condiciones comparable con aquellas de la refinería. Medidas de la filtrabilidad de licor carbonatado se acomodan para predecir la conducta de un individual azúcar crudo o determinar la calidad de cal de un nueva fuente o el efecto de un alteración de un factor variable del proceso.

* * *

Uso de filtros espesantes para primera carbonatación en la Danish Sugar Corporation. Parte I. R. F. MADSEN. *Pág.* 137–140

La historia del aplicación de filtros a bolsa para jugo de primera carbonatación en la DDS se indica. Se presentan detalles del aplicación de un sistema automática que se ha instalado en 1965 y 1966 a dos azucareras danesas para filtración de jugo de primera carbonatación. La sistema se basa en experimentos iniciales de 1963–1964.

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Le 13ème Congrès de l'International Society of Sugar Cane Technologists. p. 163–172

Après des descriptions des sucreries et autres installations en Taïwan visitées par les délégués au 13ème Congrès de l'ISSCT, on donne un rapport bref sur la cérémonie d'inauguration, les séances des sections, et de la session plénière. On mentionne la visite après le Congrès aux Philippines que plusieurs membres ont faite.

* * *

La carbonatation de liqueur. 3ème partie. Méthodes laboratoires pour la comparaison de la qualité d'échantillons de liqueur ou de chaux. M. C. BENNETT et S. D. GARDINER. p. 173–175

La seconde section de cet article traite des différents types de filtres laboratoires qu'on peut appliquer à la mesure de la filtrabilité de liqueur carbonatatée sous les conditions telles que dans la raffinerie. On présente les résultats d'essais de filtrabilité sous la forme de graphiques et donne des informations sur une installation laboratoire de carbonatation continue qui comprend deux appareils de réaction.

* * *

L'emploi de filtres-épaississeurs pour la première carbonatation dans les sucreries danoises. 2ème partie. R. F. MADSEN. p. 179–176

Dans le deuxième partie de cet article l'auteur donne les détails de filtres à poches employés dans les sucreries de la Compagnie Sucrière Danoise (DDS) et des pressions et des contrôles automatiques. On discute l'expérience dans deux sucreries danoises, y comprit la consommation du pierre à chaux et des toiles filtrantes.

* * *

Les nouvelles laboratoires de recherche de la British Sugar Corporation. p. 179–181

On donne une description des nouvelles laboratoires de recherche de la BSC récemment inaugurés à Colney, près de Norwich.

* * *

Recherches sur la canne à sucre à Maurice. p. 181–183

On présente une condensation du rapport annuel de l'Institut de Recherches de l'Industrie Sucrière de l'Ile Maurice pour l'année 1966.

Der XIII Kongress des International Society of Sugar Cane Technologists. *S.* 163–172

Nach Beschreibungen der verschiedenen Zuckerfabriken und anderen Anlagen in Taiwan, die von den Mitgliedern des XIII Kongresses des ISSCT besucht wurden, gibt man eine kurze Bericht über die Eröffnungszeremonie, die Sektionssitzungen und die Vollversammlung. Man erwähnt den von mehreren Mitgliedern nach dem Kongress gemachten Besuch der Philippinen.

* * *

Karbonatation von Kläre. Teil 3. Labormethoden für den Vergleich der Qualität von Klären- oder Kalk-Proben. M. C. BENNETT und S. D. GARDINER. *S.* 173–175

In der zweiten Sektion dieses Aufsatzes betrachtet die Verfasser Laborfilter verschiedener Arten, die für die Messung der Filtrierbarkeit von karbonatierter Kläre bei Bedingungen wie in der Raffinerie angewandt werden können. Man gibt die Ergebnisse von Versuchen auf Filtrierbarkeit in der Form von Diagrammen, und gibt Informationen über eine Laboranlage für kontinuierliche Karbonatation, die zwei Reaktionsapparate enthält.

* * *

Anwendung von eindickenden Filtern für erste Karbonatation in den dänischen Zuckerfabriken. Teil 2. R. F. MADSEN. *S.* 176–179

Im zweiten Teil dieses Aufsatzes gibt der Verfasser Informationen über die in Zuckerfabriken der dänischen Zuckergesellschaft (DDS) angewandten Beutelfilter und über die angewandten Drücke und Automatik. Er bespricht die Erfahrung in zwei dänischen Zuckerfabriken, u.a. den Kalkstein- und Filtertuch-Verbrauch.

* * *

Neue Untersuchungslaboratorien der British Sugar Corporation. *S.* 179–181

Man beschreibt die neuen Untersuchungslaboratorien der BSC, die in letzter zeit in Colney, bei Norwich, eröffnet wurden.

* * *

Zuckerrohr-Forschungsarbeit in Mauritius. *S.* 181–183

Eine Zusammenfassung des Jahresberichts des Forschungsinstituts der Zuckerindustrie in Mauritius für 1966 wird gegeben.

El 13° Congreso de la International Society of Sugar Cane Technologists. *Pág.* 163–172

Después de descripciones de las varias fábricas de azúcar y otras instalaciones y lugares en Taiwan visitado por miembros del 13° Congreso de la ISSCT, una cuenta breva se presenta de la ceremonia de abertura, las asembleas de las secciones de la Sociedad, y la sesión plenaria. Se refiere a la visita a la República Filipina de algunos miembros después del Congreso.

* * *

Carbonatación de licor. Parte III. Procedimientos de laboratorio para comparar la calidad de muestras de licor o cal. M. C. BENNETT y S. D. GARDINER. *Pág.* 173–175

La segunda sección de este artículo trata de los varios tipos de filtro de laboratorio que puede usarse para medir la filtrabilidad de licor carbonatatado en las mismas condiciones de la refinería. Se presentan en forma gráfica las resultas de pruebas de filtracion y se da información sobre un instalación de laboratorio para carbonatación continua que incorpora dos vasos de reacción.

* * *

Uso de filtros espesantes para primera carbonatación en la Danish Sugar Corporation. R. F. MADSEN. *Pág.* 176–179

En la segunda parte de este artículo se presentan detalles de los filtros a bolsa instalado en las fábricas de la Danish Sugar Corporation, y de las presiones y de los controles automáticos que se usan. Se discute la experiencia de dos azucareras danesas, que incluye notas del consumo de caliza y de tela de filtrar.

* * *

Nuevos laboratorios de investigación para la British Sugar Corporation. *Pág.* 179–181

Se describen los nuevos laboratorios de investigación de la BSC que se han inaugurado recientemente a Colney, cerca de Norwich.

* * *

Investigaciones sobre la caña de azúcar en Mauricio. *Pág.* 181–183

Se presenta un sumario del reporte anual del Instituto de Investigaciones de la Industria Azucarera de Mauricio para el año 1966.

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Installations de moulins pour le procédé moulage-diffusion. W. R. CRAWFORD. p. 195–199

On discute l'emploi de moulins à canne pour la préparation de la canne avant qu'elle soit introduite dans une diffusion aussi que pour l'extraction de l'eau contenue dans la bagasse sortie de la diffusion sur la base de l'expérience dans la sucrerie à Malelane, au Transvaal oriental. Cette sucrerie est équipée d'une diffusion De Smet précédée d'un moulin à trois cylindres ayant un alimentateur à pression à deux cylindres. On discute les avantages d'alimentateurs à pression par rapport à des travaux au Queensland.

* * *

Elévation du point d'ébullition de solutions du saccharose pur. W. M. NICOL. p. 199–203

On présente des tableaux montrant l'élévation du point d'ébullition pour des solutions de saccharose pur en fonction de la concentration et du la sursaturation à l'absence du surchauffage. Cettes données sont des valeurs revisées obtenues en considérant des données de la pression de la vapeur pour des solutions du saccharose et se basent sur un rapport entre la solubilité et la température. On donne des équations pour le calcul des facteurs variés aussi que des graphiques qui montrent les rapports entre la concentration, le rapport de la saturation, la température de la solution, la pression et l'élévation du point d'ébullition.

* * *

La diffusion type "Auto Diffuser" de la compagnie Suchem. P. P. STRICH. p. 203–205

L'auteur donne des informations sur la diffusion à canne type "Auto Diffuser", développée par Suchem Inc., et qui est actuellement le sujet d'essais à Porto Rico. L'appareil emploie la percolation pour extraire le jus et comprend 16 compartiments (arrangés tellement que former un anneau horizontal) remplis de la canne à travers de laquelle passent en séquence les fractions du jus, plus et plus dilué. La diffusion complète tourne tellement que permettre décharger la bagasse après l'extraction du jus et remplir le compartiment vide de canne fraîche.

Mühlanlagen für das Mühlung-Diffusionsverfahren. W. R. CRAWFORD. S. 195–199

Man bespricht die Anwendung von Rohrmühlen für die Vorbereitung vom Rohr bevor es in einen Diffusionsapparat geht, auch für die Entwässerung von der aus dem Diffusionsapparat austretenden Bagasse in Hinblick auf die Erfahrung in der Zuckerfabrik Malelane in Osttransvaal. Diese Zuckerfabrik hat einen Diffusionsapparat De Smet mit einer hervorgehenden Dreiwalzenmühle; die letztere ist mit einem Zweiwalzendruckspeisevorrichtung versehen. Die Vorteile von Druckspeisevorrichtungen werden in Hinblick auf Arbeit in Queensland besprochen.

* * *

Siedepunktserhöhung von reinen Saccharoselösungen. W. M. NICOL. S. 199–203

Der Verfasser stellt Tabellen von Siedepunktserhöhung für reine Saccharose-Lösungen in Abhängigkeit von Konzentration und Übersättigung in der Abwesenheit von Überhitzung dar. Diese sind verbesserte Werte, mit Betrachtung von Dampfdruckdaten für Saccharoselösungen erhalten, und beruhen auf einer Beziehung zwischen der Lösbarkeit und der Temperatur. Man gibt Gleichungen für die Berechnung der verschiedenen Faktoren, auch Diagramme, welche die Beziehungen zwischen der Konzentration, dem Sättigungsverhältnis, der Temperatur der Lösung, dem Druck und der Siedepunktserhöhung zeigen.

* * *

Der "Auto Diffuser" von Suchem. P. P. STRICH. S. 203-205

Man gibt Informationen über den "Auto Diffuser", einen Diffusionsapparat für Rohr, der von der Firma Suchem Inc. entwickelt wurde; jetzt ist der Apparat bei Versuchen in Puerto Rico. Er wendet das System von Durchsintern für die Extraktion von Saft an, und besteht aus 16 mit Rohr gefüllten Sektionen (so angeordnet, um einen waagerechten Ring zu bilden), in den immer mehr verdünnte Saftfraktionen durch das Rohr aufeinanderfolgend fliessen. Die ganze Diffusionsanlage dreht sich um eine Achse, um die Entladung von erschöpfter Bagasse und die Wiederfüllung der leeren Sektion mit frischem Rohr zu gestatten.

Unidades de molienda para el proceso molienda-difusión. W. R. CRAWFORD. *Pág.* 195–199

Una discusión del uso de trapiches para la preparación de caña antes de su entrada en un difusor y para deshidratación del bagazo descargado del difusor se presenta contra un fondo de experiencia a la azucarera de Malelane en el Transvaal Oriental. Esta azucarera se equipa con un difusor marca De Smet, precedido por un trapiche a tres mazas con un alimentador a presión con dos mazas. Las ventajas de alimentadores a presión se discuten con referencia a trabajo efectuado en Queensland.

* * *

Elevación del punto de ebulición de soluciones de sacarosa pura. W. M. NICOL. *Pág.* 199–203

Se presentan tablas de elevación del punto de ebulición de soluciones de sacarosa pura como función de concentración y sobresaturación en la ausencia de sobrecalefacción. Estos son valores revisados obtenido por consideración de dados de presión del vapor de soluciones de sacarosa, y se basen sobre una relación entre solubilidad y temperatura. Ecuaciones se presentan para la calculación de los varios factores así como gráficos que demuestran las relaciones entre concentración, razón de saturación, temperatura de la solución, presión, y elevación del punto de ebulición.

* * *

El "Auto-Difusor" marca Suchem. P. P. STRICH. *Pág.* 203–205

Detalles se presentan del "Auto-Difusor" para caña, desarrollado por Suchem Inc. y actualmente sometido a ensayo en Puerto Rico. Utiliza la sistema de percolación para extracción del jugo, y incluye 16 compartamientos (colocado en la forma de un anillo horizontal) llenado con caña, vía que pasan en serie fracciones de jugo, más y más diluido. La asemblea completa del difusor gira do modo que el bagazo agotado puede descargarse y el compartamiento vido puede rellenarse con caña fresca.

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La XIXe Conférence Technique de la British Sugar Corporation Ltd. *p.* 227–228

On présente un rapport sur la Conférence Technique de la British Sugar Corporation Ltd. de 12–14 juin 1968, et donne des sommaires des communications présentées et des discussions sur cettes communications.

* * *

La marche d'une cristallisation normale à l'égard à l'effet de la teneur en non-sucres, substances colorées et cristaux. 1è-re partie. S. ZAGRODZKI. *p.* 229–231

On a fait des calculs d'une cristallisation théorique du saccharose pur dans un appareil à cuire et a comparé les valeurs calculées avec les valeurs observées. On a calculé aussi les coefficients de retardement de la cristallisation sous l'influence de (i) la teneur en non-sucres, et (ii) la teneur en substances colorées, exprimée en fonction de l'extinction. Des tables des coefficients démontrent leurs changements pendant la cristallisation.

* * *

La production d'une suspension de semaille-cristaux pour la cristallisation de sucre dans un appareil à cuire. S. C. GUPTA et S. K. D. AGARWAL. *p.* 233

On décrit une nouvelle méthode rapide pour la production d'une suspension dans laquelle les cristaux du saccharose, précipités avec l'alcool à partir d'une solution de sucre, sont broyés dans un moulin à boulets.

* * *

La raffination du sucre—Remarques sur les procédés individuels. 4-ème partie. L'affination. F. M. CHAPMAN. *p.* 234–237

Dans la première section de cet article l'auteur, en s'appuyant sur sa grande expérience dans la raffination du sucre, considère les facteurs qui ont influence sur l'affination. Il présente le schème d'une station à affination idéalisée, comme aussi des observations sur le rapport entre la quantité de l'eau de clairçage et le rendement du sucre, et sur l'effet de l'affination sur les cristaux.

Die 19. Technische Konferenz der British Sugar Corporation Ltd. *S.* 227–228

Man berichtet über die 3-tägige Technische Konferenz der British Sugar Corporation Ltd. in Juni 1968, und gibt Zusammenfassungen der vorgelegten Vorträge und deren Eröterungen.

* * *

Der Verlauf einer normal geführten Kristallisation mit Berücksichtigung des Einflusses des Gehalts an Nichtzuckern, Farbstoffen und der Kristallmenge. Teil 1. S. ZAGRODZKI. *S.* 229–231

Man hat Berechnungen der theoretischen Kristallisation von Reinsaccharose in einem Kochapparat durchgeführt und die berechneten Werte mit beobachteten Werten verglichen. Die Koeffizienten von Kristallisationshemmung (i) unterm Einfluss der Nichtzuckermenge, und (ii) unterm Einfluss der Farbstoffmenge, als Extinktionskoeffizient ausgedrückt, werden berechnet und in Tabellen gebracht, um ihre Anderungen während der Kristallisation zu zeigen.

* * *

Die Herstellung einer Impfkristallsuspension für das Zuckerkochen. S. C. GUPTA und S. K. D. AGARWAL. *S.* 233

Die Verfasser beschreiben eine neue Schnellmethode für die Herstellung einer Suspension, in welcher die mit Alkohol aus einer Zuckerlösung niedergeschlagenen Saccharose-Kristalle in einer Kugelmühle gemahlt werden.

* * *

Zuckerraffination—Anmerkungen über Einzelverfahren. Teil 4. Die Affination. F. M. CHAPMAN. *S.* 234–237

In der ersten Sektion dieses Aufsatzes benutzt der Verfasser seine beträchtliche Erfahrung in der Zuckerraffination, um die verschiedenen Faktoren, welche die Affination beeinflussen, zu betrachten. Er stellt das Schema einer idealisierten Affinationsstation dar, wie auch Anmerkungen über die Beziehung zwischen der Deckwassermenge und dem Zuckeranfall und über den Einfluss der Affination auf die Kristalle.

19a Conferencia Técnica de la British Sugar Corporation Ltd. *Pág.* 227–228

Se presenta una cuenta de la Conferencia Técnica de la British Sugar Corporation Ltd. durante 3 días de junio 1968, con sinópsises de los papeles presentados y discusiones sobre estos.

* * *

La cursa de cristalización normal con respecto al efecto de no-aúczar, material colorante y contenido de cristales. Parte I. S. ZAGRODZKI *Pág.* 229–231.

Cálculos se han hecho de cristalización teórica de sacarosa pura en un tacho, y los valores calculados se han comparado con valores observados. Coeficientes de inhibición de cristalización por (i) concentración de no-azúcar, y (ii) material colorante expresado en términos de extinción, se calculan y presentan en forma tabular, que demuestra sus variaciones con progreso de la cristalización.

* * *

Preparación de pasta de semillas para cocción de azcúar. S. C. GUPTA y S. K. D. AGARWAL. *Pág.* 233

Se dan detalles de un nuevo método rápido para preparación de una pasta de semillas en que cristales de azúcar, precipitado de una solución de azúcar con álcool, se muelen en un molino de bolas.

* * *

Refinación de azcúar—Notas sobre procesos unitarios. Part IV. Afinación. F. M. CHAPMAN. *Pág.* 234–237

En la primera sección de este artículo, el autor trata con varios factores que se conciernen en afinación, basado sobre su larga experiencia en la refinación de azúcar. La esquema de un estación de afinación "idealizado" se presenta, así como observaciones sobre la relación entre cantidad de agua de lavado y recuperación de azúcar, y el efecto de afinación sobre los cristales.

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Erreurs dans la photométrie à flamme occasionnées par l'adsorption pendant la filtration. M. O'SULLIVAN. p. 259–260

Dans la détermination par la photométrie à flamme du potassium et du sodium dans les jus et mélasses des quatre sucreries betteravières irlandaises, des erreurs se sont produit par suite de l'adsorption des cations par le papier à filtrer. On discute des moyens de l'élimination de l'erreur.

* * *

Compression de la bagasse dans le moulin à canne. J. YOUNGER. p. 260–262

L'auteur discute la mécanique, les causes et les effets de la compression de la bagasse pendant son passage entre les cylindres supérieure et inferieures d'un moulin à canne.

* * *

La raffination de sucre. Remarques sur les procédés individuels. 4-ème partie. F. M. CHAPMAN. p. 263–268

Dans la seconde section de cet article l'auteur discute les caractéristiques de sirop de mélange et son chauffage, et ensuite le travail d'essoreuses centrifuges et les types de machines, continues et discontinues, employées.

* * *

La marche d'une cristallisation normale à l'égard à l'effet de la teneur en non-sucres, substances colorées et cristaux. 2-ème partie. S. ZAGRODZKI. p. 268–270

Dans la seconde partie de cet article, l'auteur compare les résultats d'une cristallisation théoriqne et expérimentale pour les solutions sucrées pures, impures et colorées. Ensuite il considère mathématiquement le procédé de cristallisation dans un appareil à cuire.

Fehler bei der Flammenphotometrie als Folge der Adsorption während der Filtration. M. O'SULLIVAN. S. 259–260

Bei der flammenphotometrischen Bestimmung von Kalium und Natron in Rübensaften und- Melassen der vier irlandischen Zuckerfabriken, haben sich Fehler als Folge der Kation-Adsorption auf dem Filterpapier ereignet. Einige Methoden für die Beseitigung des Fehlers werden besprochen.

* * *

Die Komprimierung von Bagasse in der Zuckerrohrmühle. J. YOUNGER. S. 260–262

Die Mechanik, Ursachen und Wirkungen der Kompression von Bagasse, als sie zwischen den Ober- und Unter-walzen fliesst, werden diskutiert.

* * *

Zuckerraffination—Anmerkungen über Einzelverfahren. Teil 4. Die Affination. F. M. CHAPMAN. S. 263–268

In der zweiten Sektion dieses Aufsatzes bespricht der Verfasser die Charakteristik von Maischsirup und seine Hitzung; danach folgt eine Diskussion von Schleuderarbeit und der verschiedenen Arten kontinuierlicher und diskontinuierlicher Maschinen, die man anwendet.

* * *

Der Verlauf einer nornal geführten Kristallisation mit Berücksichtigung des Einflusses des Gehalts an Nichtzuckern, Farbstoffen und der Kristallmenge. Teil 2. S. ZAGRODZKI. S. 268–270

Im zweiten Teil vergleicht man die Ergebnisse von theoretischer und experimenteller Kristallisation miteinander für reine, unreine und gefärbte Zuckerlösungen. Das Kristallisationsverfahren in einem Kochapparat wird mathematisch untersucht.

Errores en fotometría a llama causado por adsorción mientras la filtración. M. O'SULLIVAN. *Pág.* 259–260

En la determinación por fotometría a llama de potasio y sodio en jugos y melazas remolacheras de las cuatro azucareras irlandesas, errores han ocurrido como resulta de adsorción de cationes sobre el papel de filtro. Se discuten medidas para eliminar el error.

* * *

Compresión de bagazo en el molino de caña. J. YOUNGER. *Pág.* 260–262

Se discuten el mecánico, las causas y los efectos de compresión de bagazo cuando pasa entre las mazas superior y inferiores de un molino de caña.

* * *

Refinación de azúcar—Notas sobre procesos unitarios. Parte IV. Afinación. F. M. CHAPMAN. *Pág.* 263–268

En la segunda sección de este artículo, el autor considera varias características de meladura de mezclado y su calefacción, y también discute la operación de centrífugas y los tipos de máquina continua y no-continua que se usan.

* * *

La cursə de cristalización normal con respeto al efecto de no-azúcar, material colorante y contenido de cristales. Parte II. S. ZAGRODZKI. *Pág.* 268–270

En esta segunda parte las resultas de cristalización teórica y experimental de soluciones puros, impuros y colorados se comparan, y el proceso de cristalización en un tacho se considera matemáticamente.

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Le calcul des dernières cuites dans la fabrication de sucre. H. PONS. *p.* 291–296

L'auteur présente quatre nomogrammes pour la détermination de (1) la rétention générale des matières sèches (Brix) dans le sucre commercial, (2), la production des mélasses finales par le poids de canne, (3) la rétention % des matières sèches (Brix) dans les dernières cuites, et (4) le volume de la dernière masse cuite par le poids de canne. On fait des calculs comme exemples et dispose les résultats en tables.

* * *

La comparaison entre le dioxyde de soufre et l'aldéhyde formique comme bacteriostats dans la diffusion. 1-ère partie. J. F. T. OLDFIELD, J. V. DUTTON, D. GRIERSON, R. K. HEANEY et H. J. TEAGUE. *p.* 296–298

On discute l'emploi du dioxyde de soufre (en forme gaseuse) comme alternatif à l'aldéhyde formique pour le contrôle du pH dans la diffusion, et présente des résultats d'essais laboratoires et dans la sucrerie sous la forme de graphiques qui démontrent les effets de SO_2 et de l'aldéhyde formique sur le changement du pH dans des échantillons de jus incubé.

* * *

La solubilité du saccharose dans l'eau à des températures dans l'intervalle de 144–185°C. J. FERNÁNDEZ B. *p.* 299–300

La précision des données de la solubilité du saccharose de BENRATH pour les températures entre 100 et 144°C est evaluée en employant une équation dérivée par SCHRÖDER. On montre que les valeurs se trouvent le long d'une ligne étroite, que l'on emploie pour le calcul de la solubilité du saccharose a des températures entre 144 et 185°C par des intervalles de 5°. La formule est donnée pour le calcul à cettes températures plus hautes.

Berechnung der Nachproduktfüllmassen in der Zuckerfabrikation. H. PONS. *S.* 291–296

Man gibt vier Nomogramme für die Bestimmung (1) der Gesamtbehaltung der Trockensubstanz (Brix) in Handelszucker, (2) der Erzeugung von Endmelasse auf Rohrgewicht, (3) der Trockensubstanz (Brix) % der Behaltung in Nachproduktsuden, and (4) des Nachproduktfüllmasse-Volumens auf Rohrgewicht. Berechnungen werden als Beispiele durchgeführt und die Ergebnisse in Tabellen gebracht.

* * *

Vergleich von Schwefeldioxyd und Formaldehyd als Bakteriostate in der Saftgewinnung. Teil 1. J. F. T. OLDFIELD, J. V. DUTTON, D. GRIERSON, R. K. HEANEY und H. J. TEAGUE. *S.* 296–298

Die Verfasser diskutieren die Anwendung con Schwefeldioxydgas statt Formaldehyds für die pH-Kontrolle in der Saftgewinnung, und geben einige Ergebnisse von Fabrik- und Laborversuchen in der Form von Diagrammen, welche die Wirkungen von SO_2 und Formaldehyd auf pH-Anderungen in inkubierten Saftproben zeigen.

* * *

Lösbarkeit von Saccharose in Wasser bei Temperaturen im Bereich von 144–185°C. J. FERNÁNDEZ B. *S.* 299–300

Die Genauigkeit von BENRATH s Lösbarkeitdaten für Saccharose bei Temperaturen im Bereich von 100–144°C wird an Hand einer von SCHRÖDER abgeleiteten Gleichung abgeschätzt. Die Werte liegen auf einer Gerade, die für die Berechnung von Saccharose-Lösbarkeit bei Temperaturen im Bereich von 144–185°C je 5° angewandt wird. Die Formel für die Berechnung bei diesen höheren Temperaturen wird gegeben.

Cálculo de las templas finales en la fabricación de azúcar. H. PONS. *Pág.* 291–296

Se presentan cuatro nomografías para determinar: (1) la retención general de sólidos Brix en azúcar comercial, (2) producción de melaza final por unidad de peso de caña, (3) sólidos Brix % retención en templas finales, y (4) volumen de la templa final por unidad de peso de caña. Cálculos ejemplares se hacen y las resultas se presentan en forma tabular.

* * *

Comparación de dióxido de azufre y formalina como bacteriostates en difusión. Parte I. J. F. T. OLDFIELD, J. V. DUTTON, D. GRIERSON, R. K. HEANEY y H. J. TEAGUE. *Pág.* 296–298

Se discute el uso de dióxido de azufre en forma gaseosa como alternativa de formalina para control de pH en difusión y resultas de pruebas en la fabrica y el laboratorio se presentan en la forma de gráficas que demuestran los efectos de SO_2 y HCHO sobre la variación de pH de muestras de jugo incubadadas.

* * *

Solubilidad de sacarosa en agua en el alcance 144–185°C. J. FERNÁNDEZ B. *Pág.* 299–300

La confianza de los dados de BENRATH de solubilidad de sacarosa en el alcance 100–144°C se evalua por medio de un ecuación desarrollado por SCHRÖDER. Los valores se encuentran á lo largo de una linea recta, que se usa para calcular la solubilidad de sacarosa en el alcance de temperatura 144–185°C. Se presenta la fórmula para el cálculo en este alcance alto.

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Commandes souples pour des moulins à canne. J. W. HILL. *p.* 323–327

L'auteur décrit deux systèmes de commande que l'on peut employer dans des moulins à canne, à savoir une commande directe, hydraulique, ou le train entier de réducteurs est omis, et un accouplement de Cardan spécial pour un moulin existant.

* * *

Recherches sur canne à sucre au Queensland. *p.* 327–330

C'est un sommaire du rapport annuel (1967) du Bureau of Sugar Experiment Stations; il traite d'essais avec azote, phosphate, potasse et soufre; des études sur une manque de cuivre et de magnésium dans la canne; le désherbage; l'élévage de canne et des variétés nouvelles; des maladies de canne et des insectes nuisibles.

* * *

La comparaison entre le dioxyde de soufre et l'aldéhyde formique comme bacteriostats dans la diffusion. 2-ème partie. J. F. T. OLDFIELD, J. V. DUTTON, D. GRIERSON, R. K. HEANEY et H. J. TEAGUE. *p.* 330–333

Dans la seconde section de cet article les auteurs décrivent des essais sur l'incubation avec des échantillons de jus à partir d'une diffusion RT, en montrant les effets de H_2SO_3, formaline et sulfite de soude sur des changements de pH et de formaline et de Na_2SO_3 sur la formation de nitrite. On examine aussi des pertes de SO_2 dans jus brut à cause de réactions chimiques et le destin de SO_2 dans le chaulage et la carbonatation.

* * *

La détermination de phosphates dans le jus clarifié. E. C. VIGNES. *p.* 333–334

L'auter présente une méthode colorimétrique pour la détermination de phosphate dans jus clarifié. On emploie l'acide ascorbique comme réducteur; la couleur bleue développant au point d'ébullition de la solution est plus stable et moins sujette à interférence que dans le cas ou l'on emploie la chlorure d'étain.

Nachgiebige Antriebe für Zuckerrohrmühlen. J. W. HILL. *S.* 323–327

Zwei Antriebeinrichtungen, die für Zuckerrohrmühlen anwenden werden können, werden beschrieben, und zwar ein direkt angeschlossener, hydraulischer Antrieb, wobei das ganze Reduktionsräderwerk ausgelassen wird, und ein besonderes Kardangelenk für eine bestehende Mühle.

* * *

Zuckerrohr-Forschungsarbeit in Queensland. *S.* 327–330

Dies ist eine Zusammenfassung des Jahresberichts (1967) des Bureau of Sugar Experiment Stations und betrachtet: Versuche mit Azot, Phosphat, Kali und Schwefel; Studien über die Mängel an Kupfer und Magnesium in der Zuckerrohr; die Unkrautbekämpfung; die Rohrzüchtung und neue Sorten; und Rohrkrankheiten und -Schädlinge.

* * *

Vergleich von Schwefeldioxyd und Formaldehyd als Bakteriostate in der Saftgewinnung. Teil 2. J. F. T. OLDFIELD, J. V. DUTTON, D. GRIERSON, R. K. HEANEY und H. J. TEAGUE. *S.* 330–333

In der zweiten Sektion dieses Aufsatzes besprechen die Verfasser einige Inkubationsversuche mit von einem RT-Diffusionsapparat stammenden Saftproben; die Ergebnisse zeigen die Wirkungen von H_2SO_3, formalin und Natriumsulphit auf pH-Anderungen und von Formalin und Na_2SO_3 auf Nitritbildung. SO_2-Verluste in Rohsaft durch chemische Reaktionen und das Schicksal von SO_2 während der Scheidung und der Karbonatation wurden auch untersucht.

* * *

Die Phosphatbestimmung in Klarsaft. E. C. VIGNES. *S.* 333–334

Man beschreibt eine kolorimetrische Methode für die Bestimmung des Phosphats in Klarsaft. Ascorbinsäure wird als Reduktionsmittel angewendet, weil die beim Lösungssiedepunkt entstehende Blaufarbe mehr stabil und nicht so empfindlich gegen Störungen ist, als wenn man Zinnchlorur anwendet.

* * *

Accionamientos flexibles para molinos de caña. J. W. HILL. *Pág.* 323–327

Dos posibilidades conveniente para accionamiento de un molino de caña se describen, á saber un accionamiento hidráulico directo, en que se omite el engranaje entero, y un especial acoplamiento universal para un molino existente.

* * *

Investigaciones sobre caña de azúcar en Queensland. *Pág.* 327–330

Esto es un sumario del reporte anual de 1967 del Bureau of Sugar Experiment Stations. Se trata de ensayos con nitrógeno, fosfato, potasio y azufre; estudios de faltas de cobre y magnesio en la caña; control de malas hierbas; la crianza de caña y nuevas variedades; y enfermidades y plagas de caña.

* * *

Comparación de dióxido de azufre y formalina como bacteriostates en difusión. Parte II. J. F. T. OLDFIELD, J. V. DUTTON, D. GRIERSON, R. K. HEANEY y H. J. TEAGUE. *Pág.* 330–333

En la segunda sección de este artículo se presentan detalles de experimentos en que muestras de jugo de un difusor RT se incuban. Estos muestran los efectos de ácido sulfuroso, formalina y sulfito de sodio sobre cambio de pH y de formalina y sulfito de sodio sobre formación de nitrito. Se examinan también las perdidas de dióxido de azufre en jugo crudo por reacciones químicas y el destino de dióxido de azufre en el tratamiento con cal y en carbonatación.

* * *

Determinación de fosfatos en jugo clarificado. E. C. VIGNES. *Pág.* 333–334

Se describe un método colorimétrico para determinar fosfato en jugo clarificado. Acido ascorbico se usa como agente reductor, siendo el color azul desarrollado al punto de ebullición de la solución más estable y menos sujeto á interferencia que cuando se usa cloruro estañoso.

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Dextrane et l'élongation de cristaux. D. N. SUTHERLAND. *p.* 355–358

Des essais, dans lesquels on a laissé croître des cristaux à partir de sirop, ont montré que dextrane ajoutée aux sirops a causé l'élongation des cristaux le long du *c*-axe; donc il faut la regarder comme impureté très nuisible, ayant bien plus grand effet sur la forme de cristaux que l'ont des autres polysaccharides examinés.

* * *

La production d'une boue sèche à l'aide de filtres-presses mécanisés. M. KEIJZER. *p.* 358–360

On donne des informations sur la performance pendant plusieurs campagnes de filtres-presses Choquenet à la station de filtres de jus de première carbonatation dans la sucrerie à Groningen en Hollande.

* * *

L'emploi de bandes plastiques pour identifier des tiges de canne. A. C. ARVIER. *p.* 360–361

L'emploi de bandes en polyéthylène bleu, attachées à des tiges de canne, a plusieurs avantages en comparaison avec des autres méthodes pour detérminer les limites de terrains de canne expérimentaux, où la canne sera brûlée. On décrit le système employé.

* * *

Caractérisation statistique de la phospho-défécation de jus de canne. A. J. MACRITCHIE et R. M. MORRIS. *p.* 362–365

A partir d'une évaluation statistique du comportement, pendant la clarification, de jus des variétés de canne N:Co 376 et N:Co 310, on a dérivé une corrélation pour prédiction précise de la turbidité de jus clarifié à partir de plusieurs variables de procédé.

* * *

La canne à sucre au Libéria. p. 365

On discute brièvement la cultivation de canne à sucre au Libéria, comme aussi les espoirs pour la production de sucre à l'avenir.

Dextran und Kristallverlängerung. D. N. SUTHERLAND. *S.* 355–358

Versuche, in den Kristalle aus Sirop wachsen lassen wurden, zeigten, dass die Zugabe von Dextran eine Kristallverlängerung in Richtung der *c*-Achse bewirkt, so dass Dextran, das eine viel grössere Einwirkung auf Kristallhabitus als andere Polysaccharide hat, als besonders schädliche Verunreinigung betrachten muss.

* * *

Die Erzeugung eiges Trockenschlamms auf mechanizierten Filterpressen. M. KEIJZER. *S.* 358–360

Man gibt Informationen über die Leistung im Laufe mehrerer Kampagnen von Filterpressen Choquenet in der Filterstation für I. Saturationssaft in der Groningen'schen Zuckerfabrik in den Niederlanden.

* * *

Die Anwendung von plastischen Bändern, um Rohrstengel zu identifizieren. A. C. ARVIER. *S.* 360–361

Die Anwendung von an Rohrstengeln angebundenen, blauen Polyäthylen-Bändern hat mehrere Vorteile vor anderen Methoden für die Bezeichnung der Grenzen von Versuchsflecken im Falle von zubrennendem Rohr. Das angewandte System wird beschrieben.

* * *

Statistische Charakterizierung der Phospho-Defäkation von Rohrsaft. A. J. MACRITCHIE und R. M. MORRIS. *S.* 362–365

An Hand einer statistischen Erschätzung des Verhaltens während der Klärung von Saft aus N:Co 376 und N:Co 310 Rohrsorten hat man eine Korrelation abgeleitet, die eine genauige Berechnung der Klarsafttrübung aus einer Anzahl Verfahrens-Veränderlichen gestattet.

* * *

Rohrzucker in Liberia. *S.* 365

Der Zuckerrohranbau in Liberia und Zukunftsaussichten für Zuckererzeugung werden kurz besprochen.

Dextrana y alargamiento de cristales. D. N. SUTHERLAND. *Pág.* 355–358

Por medio de ensayos en que cristales se desarrollan de meladura, se muestra que la adición de dextrana causó elongación de los cristales á lo largo del eje *c*, y por eso debe considerarse como un impureza particularmente nocivo, con un efecto sobre forma cristalina mucho más grande que otros polisacáridos que se han investigado.

* * *

Producción de un cachaza seca con filtro-prensas mecanizadas. M. KEIJZER. *Pág.* 358–360

Se presentan detalles del obra, mientras algunas campañas, de filtro-prensas marca Choquenet, en la estación de filtracion de jugo de la primera carbonatación a la azucarera de Groningen en Holanda.

* * *

El uso de tiras plásticas para identificar tallos de caña. A. C. ARVIER. *Pág.* 360–361

El uso de tiras de polietileno azul, anudado a tallos de caña, tiene algunas ventajas sobre otros métodos para definir los límites de tablones experimentales cuando la caña se quemará. Se describe la sistema que se emplea.

* * *

Caracterización estatistical de la fosfo-defecación de jugo de caña. A. J. MACRITCHIE y R. M. MORRIS. *Pág.* 362–365

De un valuación estatistical de la conducta en clarificación de jugo de caña de variedades N:Co 376 y N:Co 310, se deriva una corelación para predecir exactamente la turbidez de jugo clarificado de un número de variables del proceso.

* * *

La caña de azúcar en Liberia. *Pág.* 365

La cultivación de caña en Liberia y perspectivas del futuro para producción de azúcar se discuten brevamente.

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Notes & Comments

Happy New Year!

We offer our readers this traditional greeting with the first issue of 1968, with some confidence that the coming year will indeed provide a considerable measure of relief after the strains of the past four years. In the crop year 1966/67 sugar consumption matched production and, in spite of the International Sugar Council's estimates, it is virtually certain that there will be a marked reduction, by some 2½–3 million tons, in the burden of stocks which has hung over the world sugar market and depressed prices to hopelessly uneconomical levels since 1964.

Stocks are thus likely to be reduced to about 14 million tons by next August, reaching a proportion on annual consumption corresponding to the 1962/63 period when prices soared to over £100 per ton on the London Terminal market. While at present there is still adequate sugar available, prices have nevertheless risen to about double their lowest value of a year ago, and should rise steadily through the year so that producers should start to make money as well as sugar. If, in the 1968/69 crop, production should continue to stay at about the same level as 1967/68, stocks would be reduced even further, to quite unpractical levels, and prices would rocket—but before that happens it is likely that funds would be readily available for investment in new factories and expansion of existing facilities. So it seems likely that sugar machinery and equipment suppliers should also be able to look forward in 1968 to improved sales to the industry.

It might be appropriate to sound a cautionary note, however, at this time; most of the troubles of the past four years could have been avoided had there been less of a headlong rush to increase production capacities in 1962 and 1963 whereby overproduction caused the plunge to low levels from which the sugar price is only now recovering. Let us hope that, by mutual agreement of sugar producers, through a new I.S.A. or otherwise, the bright prospects for the future are not marred by a similar precipitate over-expansion.

International Sugar Council.

The 25th Session of the International Sugar Council was held at the seat of the Council in London on 16th and 17th November 1967 and was attended by representatives of forty-two countries and by observers from the EEC and FAO.

The Council noted that, following the accession to the Agreement by Barbados and Honduras, the total membership of the Council was now 52 countries.

The Council adopted the first estimate made by its Statistical Committee of the net import requirements of the world market in 1968 amounting to 16·5 million tons. This amount, the details of which appear elsewhere in this issue, included again an estimate of likely net import requirements by Mainland China and also a provision to cover possible statistical underestimates, errors and omissions, in the light of the experience in respect of past estimates. Bearing in mind the Committee's first estimate of total sugar available in the countries concerned, the Council accepted the view of the Committee that there would be a relative balance between production and consumption in 1968, i.e. that there would be no significant increase of stocks. In this latter respect, the Council welcomed a preliminary indication by the Statistical Committee that, bearing in mind the proportion of world stocks needed by the countries concerned for their own internal purposes, the size of the real stock likely to have an unfavourable effect on market behaviour might amount to no more than about 4% of world consumption. In view of the generally accepted assumption that this is broadly speaking the annual rate of consumption growth on a world wide basis, the Council saw in this preliminary conclusion a most encouraging omen for any future attempts to bring about a balance between world production and consumption. It therefore agreed to invite its Statistical Committee further to investigate this most important field of stocks and to report upon any new findings in this respect.

The Council received an oral report on the preparations to date carried out within the framework of

UNCTAD with a view to a resumption of negotiations leading to a new International Sugar Agreement. Information was given on the results of the visits by the Secretary-General of UNCTAD to some of the capitals most concerned, following which provision was made for a negotiating Conference to be held in the spring of 1968. Further progress had been made during the recent discussions of the Pre-Conference Committee of Experts in Geneva in October 1967[3]. The Council welcomed these developments, which were entirely consistent with its wish that a Conference should be reconvened at the earliest possible date, in view of the general belief that such a Conference now had a reasonable chance of success.

The Council received a further report from its Sugar Consumption Committee on recent developments in the field of promotion of sugar consumption, in particular on its own investigations into the possible use of sugar in animal feeding stuffs and for other non-food purposes. In this connexion, it noted with great interest that a comprehensive study of the use of sugar in animal feeding stuffs was being carried out in Belgium and that its results were expected to be published in the near future.

The Council, by acclamation, elected Dr. ZDENEK JUNG, of Czechoslovakia, as its Chairman, and Mr. E. A. ODOI, of Ghana, as its Vice-Chairman, for 1968, and also appointed its Committees.

The Council's reference to a "relative balance" between production and consumption and to "no significant increase in stocks" could only be interpreted to mean that, however small, there would still be a surplus in 1968 to add to the accumulated stocks brought forward. C. Czarnikow Ltd. comment[4]:

"It is difficult to see how the Council can have arrived at its conclusions. Its estimate of net import requirements in 1968 is 16·5 million tons, which is closely in line with trade views. This implies that the surplus from production in 1968 in the exporting countries must have been put at something in excess of 16·5 million tons. This quantity is completely out of line with trade views and it can only be assumed that in view of the Negotiating Conference in April some producers must have submitted optimistic estimates of their output next year. The difficulty which would face the Council if it were to attempt to reject a figure submitted by a member government can be understood, but it should not be impossible to make some provision whereby the overall total of supplies could be reduced by an acceptable factor, thereby taking account of the natural inclination for production estimates to be inflated."

* * *

Commonwealth Sugar Agreement.

The 1967 talks between the parties to the Commonwealth Sugar Agreement ended on the 23rd November.

The price arrangements for the three years 1966/68 were determined at the 1965 talks. The Negotiated Price for 1968 will be £43. 10s a long ton f.o.b. and stowed bulk 96°, with a special payment of up to £4 per ton for the less developed exporting territories. The Negotiated Price will be reviewed at the 1968 talks when the price has to be determined for the three years 1969/71.

Negotiated Price Quotas for 1968 will again be at the level consolidated in 1965 (Rhodesia's N.P.Q. of 25,000 tons remains in suspense). These are:

Australia	335,000	long tons
British Honduras	20,500	,, ,,
East Africa (Kenya, Tanzania, Uganda)	7,000	,, ,,
Fiji	140,000	,, ,,
India	25,000	,, ,,
Mauritius	380,000	,, ,,
Swaziland	85,000	,, ,,
West Indies and Guyana	725,000	,, ,,

In view of the British Government's application to join the European Economic Community, it was agreed not to discuss at the talks this autumn the question of extension of the Commonwealth Sugar Agreement beyond its current terminal date of 31st December 1974.

Other items discussed included the progress being made towards a new International Sugar Agreement.

* * *

US sugar quota, 1968.

In November the US Secretary of Agriculture announced his proposals for an overall supply quota of 10,400,000 short tons of sugar, raw value, for 1968. Of this total, it is proposed that 6,545,375 tons should be supplied by domestic producing areas and the remainder by foreign suppliers.

He also proposed that imports from the latter should be limited to 700,000 tons in the first quarter of 1968 and to 1,400,000 tons during the second quarter, i.e. a total permissible importation of 2,100,000 tons during the first half of 1968. In the announcement, the Secretary said that it appeared reasonable to expect that sugar consumption during 1968 would resume its long-term trend of increasing about in line with population growth. On that basis, a consumption of about 10,400,000 tons could be anticipated during this year. The quotas for individual areas and foreign countries appear elsewhere in this issue, together with the 1967 quotas as amended to allow for increased total quotas and reallocation of deficits.

C. Czarnikow Ltd. remark[4]: "It has been suggested that eventually it will be necessary to raise the Supply Quota while, in any case, it is anticipated that domestic areas will fall short of their entitlements by at least 750,000 tons, which quantity will have to be reallocated for foreign countries. Furthermore, imports outside the quota, even though they will probably be lower than in 1967, will almost certainly exceed 200,000 tons, which would bring the total import requirement of the United States from foreign countries next year to at least 4·8 million short tons, or more than 4·3 million metric tons."

[3] *I.S.J.*, 1967, **69**, 353.
[4] *Sugar Review*, 1967, (842), 213.

The Effect of Mill Settings on Bearing Pressures in a Three Roller Mill

By J. YOUNGER, B.Sc., A.M.I.Mech.E.

IN the conventional three roller cane crushing mill it is universally recognized that the initial setting ratios become modified as the top roller is forced upward by the feed. When designing the settings, the engineer will make allowances for this. If, for example, it is considered that the best results are obtained when the ratio lies between $2\frac{1}{2}$ to one and 2 to one, the engineer will try to make his settings such that, when the feed has caused the top roller to float, the ratios will be within this range.

How much should the top roller be required to rise before the desired ratio is obtained?

There are quite wide differences of opinion about this; some maintain that the lift should not exceed $\frac{1}{8}$-in, while others claim that the necessary rise should be about $\frac{3}{8}$-in. The latter argue that, even if the feed becomes minimal, the cane will have at least one good squeeze in each unit in the tandem.

It is proposed to examine the distribution of forces in a three roller mill just before the top roller starts to rise.

Fig. 1 shows such a mill, having 19 in × 26 in journals, and a hydraulic load of 265 tons on the top roller journal.

It is assumed that the bearings have been well fitted and are well lubricated. The coefficient of friction between the top half bearing and the mill housing has been taken as 0·15. This figure, of course, depends on the presence or absence of lubricant, but it is difficult to ensure adequate lubrication here at all times.

The two extreme cases will be (a) when the feed roller does no significant work, and (b) when the work load is evenly divided between the feed and bagasse rollers. Between these extreme positions, four intermediate cases have been considered.

In case 1, the reaction between the top and bagasse rollers will lie along the line joining the centres of these two rollers, and will be equal to the hydraulic load divided by cos 38° for this particular mill and setting.

As the feed builds up, the feed roller will be called upon to increase its share of the work. In Fig. 1, the reactions in the two extreme cases are shown by AT and AO, while the four intermediate cases lie on the lines AS, AR, AQ and AP, where the feed roller is carrying 10%, 20%, 30% and 40% of the load respectively.

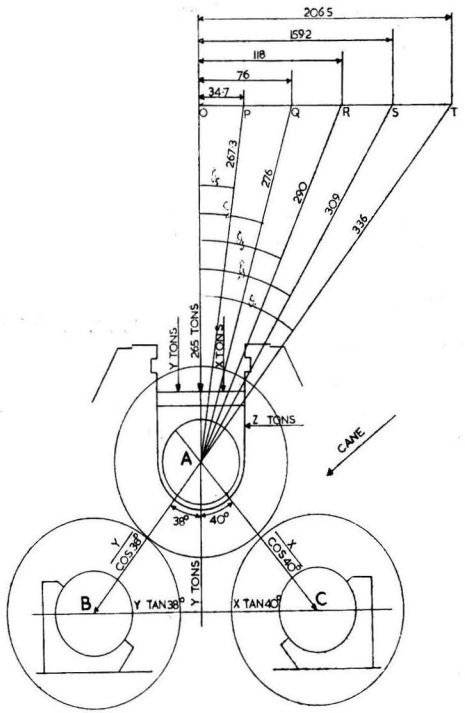


Fig. 1.

The calculated results are given in Table I. The hydraulic load has been divided into Y tons and X tons, Y being the portion of the load carried by the bagasse roller and X that carried by the feed roller. $(Y + X)$ equals 265 in this case.

Table I

Case	*Hydraulic load 265 tons* Y	X	AB	AC	*Pressure on bagasse bearing* $\frac{AB \times 2240}{494}$ *lb/sq.in.*	*Load on top bearing* $(W = 265 + \mu 265 \tan \theta)$	*Pressure on top bearing* $(P = \frac{W \times 2240}{494})$ *lb/sq.in.*
1	265	0	336	0	1520	296	1340
2	238·5	26·5	303	34·6	1375	288·2	1310
3	212	53	269	69·2	1220	282·7	1282
4	185·5	79·5	236	103·8	1070	276·4	1257
5	159	106	202	138·5	912	270·2	1230
6	132·5	132·5	168	168	745	265	1200

Fig. 2 shows the tabulated results in graphical form. It will be noted that when the feed roller is carrying less than 15% of the hydraulic load, the bearing pressures rise above the safety limit, and this is especially true of the bagasse roller bearing.

From Fig. 1, it will be seen that the direction of the resultant thrust tends to move steadily towards the vertical as the percentage of the work done by the feed roller increases. When the loads on the two rollers are exactly in balance, the resultant is vertical. When this is the case, the horizontal thrust between the bearing and housing disappears.

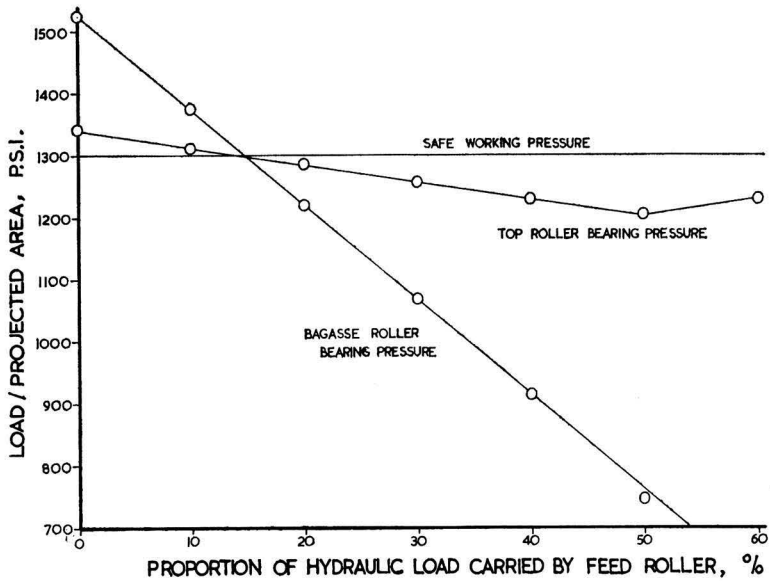


Fig. 2. Variation in bearing pressures with work done by feed roller.

This thrust is of considerable magnitude before the top roller starts to rise, and diminishes steadily as it rises. When the share of the load on the feed roller is 10%, the horizontal thrust in the case under consideration is 159·2 tons. As the area of the side of the top half bearing in contact with the housing would be about 288 sq. inches, the pressure between the surfaces would be 1240 lb/sq.in. This represents a serious obstacle to the free floating of the top roller.

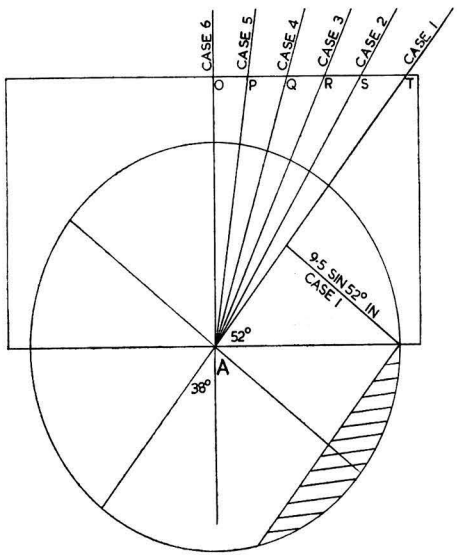


Fig. 3.

Case 1: Effective projected area of bearing = 442 sq. in.
Case 2: ,, ,, ,, ,, = 459 ,,
Case 3: ,, ,, ,, ,, = 473 ,,
Case 4: ,, ,, ,, ,, = 485 ,,
Case 5: ,, ,, ,, ,, = 491·5 ,,
Case 6: ,, ,, ,, ,, = 494 ,,

There is one other factor which influences the bearing pressures on the top journals in conventionally designed mills.

Fig. 3 illustrates the 19 in × 26 in journal with the top half brass mounted on it. The direction of thrust for each of the six cases cited is shown as in Fig. 1. The journal will, of course, be forced in the direction of this resultant thrust, and it will be seen that the full width of the bearing cannot be utilized and the effective bearing area is reduced accordingly.

Fig. 4 shows this graphically. It will be seen that the top roller bearing overload conditions continue until the feed roller is doing 25% of the work, and not 15% as deduced from Fig. 2.

If calculations are made for other journal sizes with corresponding hydraulic loading, very similar graphs can be obtained. The critical point, where the top roller bearings are overloaded, is reached when the feed roller carries between 20% and 25% of the load. Where the work done by the feed roller is 15% or less, the bagasse rollers are also at the critical point.

Throughout this argument, the safe working pressure has been taken as 1300 lb/sq.in. It is known that higher pressures are often advocated. Fig. 5 shows the 19 in × 26 in journal with 300 tons on it,

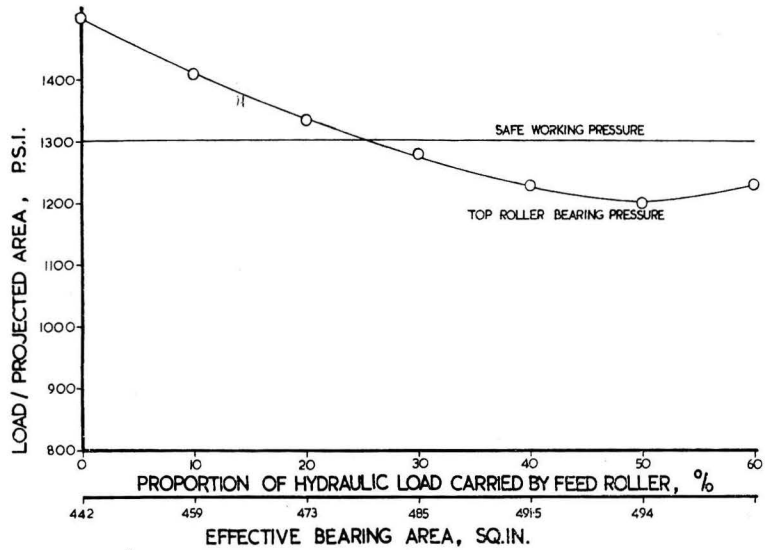


Fig. 4. Corrected top bearing pressures, hydraulic load 265 tons.

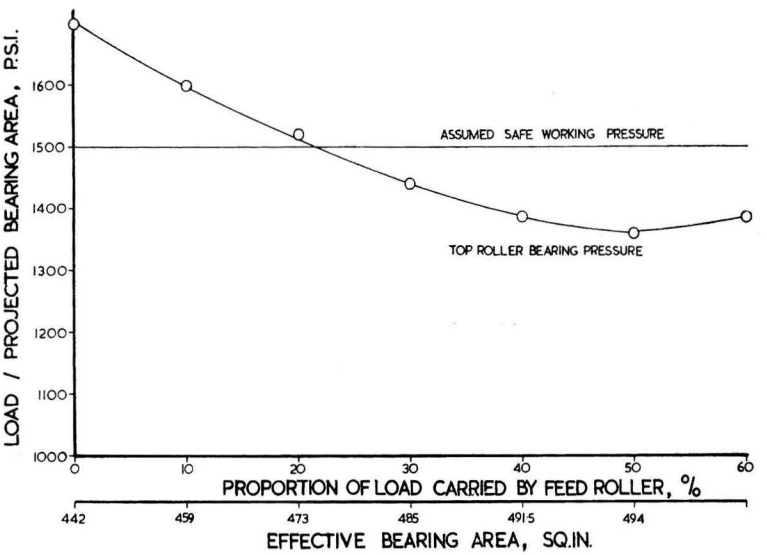


Fig. 5. Corrected top bearing pressures, hydraulic load 300 tons.

and the safe working pressure has been taken as 1500 lb/sq.in. Again the critical point comes at the same place on the graph.

Arriving at the correct initial setting is mostly a matter of experience. The various ingenious setting formulae which have been suggested can only give a starting point from which to reach the best setting to suit a particular mill and the cane it crushes. It would seem to be prudent to start with the feed roller too close rather than too open, because a journal overheated and damaged at the beginning can be a source of trouble throughout the crop.

Iraq sugar factory[1].—The Italian firm Reggiane-Officine Meccaniche Italiane, Reggio, Emilia, has signed a contract for the supply of a cane sugar factory to Iraq.

[1] F. O. Licht, *International Sugar Rpt.*, 1967, **99**, (31), 15.

Sugar Beet in West Pakistan

PRELIMINARY small-scale trials[1] with sugar beet in West Pakistan have yielded some interesting results, especially as these were made under climatic conditions very different from those of most sugar beet growing countries. The object of the trials was to explore the possibility of sugar beet as a commercial crop to supplement the sugar cane industry in the production of sugar and to introduce a new cash crop for farmers.

Two sets of trials were laid out, one in co-operation with an English firm and the other under the direct supervision of the Ayub Agricultural Research Institute at Lyallpur. In the former, the small plots were sown with five different varieties of sugar beet, viz. Bush-N, Bush-E, Battles-E, Triplex and Camkilt. Two sowing dates (first and fourth week of October) and two harvest dates (middle of May and middle of June) were chosen. The varieties Triplex and Battles-E gave the best results in terms of yield and sugar production. Early sowing with late harvest proved to be the best combination.

In the second set of trials four varieties of sugar beet were sown with three combinations of sowing dates (7th October; 26th October; 16th November) and two harvesting dates (5th June; 28th June). The varieties used were: KGKW-Polybeet, KGKW-E, KGKW-N and KGKW-Z. Unfortunately these trials were spoiled by the attack of insects, grey weevil soon after germination and cutworms later, causing severe defoliation in spite of efforts to control the pests. However, results again pointed to the advantage of early sowing and to the superiority of the variety KGKW-E.

The field used for the trials received six to eight ploughings as preparatory tillage. During the month of September farmyard manure was applied at the rate of 40 lb nitrogen per acre. At the time of planting, superphosphate at the rate of 50 lb P_2O_5 per acre, borax at the rate of 15 lb per acre and sulphate of ammonia at the rate of 40 lb nitrogen per acre were applied to the soil before the preparation of ridges. The first irrigation was carried out after the dry sowing of the seed on the tops of the ridges and 15–16 irrigations were given altogether. From the second week in April irrigation was performed at night because of the intense heat during the day.

Weeding or hoeing was performed at frequent intervals, 8–9 hoeings being given altogether during the growing period. Thinning or singling, to a spacing of 8–9 inches, was done by hand during the early stages of growth. The earthing-up of the crop was performed in the first week in January. Prior to harvesting (by hand) a light irrigation was given to facilitate removal of the beets. After topping by hand the roots were weighed and samples taken for estimation of sugar content. This was satisfactory.

With regard to the possibilities of large-scale cultivation of sugar beet in India or Pakistan and factory processing, other factors may need consideration. One of these is the question of fuel. Sugar cane provides its own fuel in the form of bagasse but beet does not. In many part of the Indian subcontinent fuel is at a premium.

F.N.H.

[1] *Ann. Rpt. Ayub Agric. Res. Inst.* (Lyallpur), 1964-65, 157-165.

The Sugar Terminal of Lourenço Marques

By T. L. SIMMS

ALREADY the improvements to the port of Lourenço Marques, Mozambique, are proving invaluable. Shipments of sugar to Europe and all parts of the world are being dispatched with an efficiency that would have been hard to believe a year ago. This is achieved by a routine that is simplicity itself.

The sugar arrives in trucks at the reception yards, is weighed by a weighbridge and is unloaded to the tipplers at an average rate of 320 tons per hour by two buckets suspended from an overhead bridge. It is then taken to the storage shed by a system of belt conveyors and up to a distributor conveyor located at a height of 20 metres above the floor in such a manner that it can stevedore the sugar to any distance along the shed.

Total storage capacity is 80,000 tons and the construction of two additional similar sheds has been planned for the future, should the traffic be sufficient to justify such an expansion.

Under the longitudinal axis of the floor of the shed passes a belt conveyor fed by gravity. Once outside, sugar climbs on the way to the wharf and passes to a precision continuous weighbridge, installed in a tower, where the sugar is again weighed before shiploading. Along the wharf runs a belt conveyor by means of which the sugar is delivered from the weigher to a shiploading tower, which moves along the wharf and projects the sugar into the ships' holds at an average rate of 750 tons per hour.

In the base of the weighing tower is the cabin where the controls for all the installation are centralized. The operator faces a control panel with warning and indicator lights and acoustic signals.

Total cost of the terminal was 70,000 contos (approx. £900,000).

Surface Active Constituents in Beet Sugar Crystallisation

By J. F. T. OLDFIELD and J. V. DUTTON
(British Sugar Corporation Research Laboratories, Colney, Norwich, England)

Paper presented to the 13th General Assembly, Commission Internationale Technique de Sucrerie (C.I.T.S.), 1967

PART I

THE white sugar of commerce is an extremely pure substance, the total non-sugars normally representing less than 1 part in 1000. Even at the trace levels remaining in white sugar, it is possible to measure many of the individual non-sugars, and in an earlier report[1] it was shown that many of these non-sugars were present in the same relative proportions in the sugar as in the syrup before crystallization. This finding was consistent with the view that these non-sugars arise from very small amounts of mother liquor remaining as a surface film or occluded within the sugar crystals.

The crystallization process is remarkably efficient in eliminating these non-sugars from the syrup so that, in general, the amounts remaining on the crystal represent a reduction in concentration relative to sugar by a factor of some 200 to 300.

It was also shown that some particular non-sugars were eliminated less efficiently and so represented a higher proportion of the traces on the crystal than of the bulk non-sugars in the syrup. This group of non-sugars included those which are occasionally responsible for floc and foaming with some sugars.

Surface-active materials are involved in both floc and foaming but, although the heterogeneous constituents of floc can be classified at least into broad groups of chemical compounds, the prime source of foaming cannot be attributed to any part of the methanol-soluble fraction of floc.

The present study describes an investigation to isolate and identify components of major significance in the foaming characteristics of sugars.

Relationship between floc and foaming index

The polarographic oxygen maximum test[2] provides a rapid means of assessing whether a sugar solution will remain free from floc on acidification. A rapid method is necessary since the potential floc materials in total generally represent much less than 10 mg per kilo of sugar, and even if the material is present in sufficient concentration to flocculate on acidification, such flocculation may not occur until after standing for several days.

It is generally agreed[1,3,4] that the methanol-soluble beet saponin, a glycoside of oleanolic acid, is the primary cause of visible floc but that, if sufficient saponin is present to permit flocculation, other non-sugars co-flocculate with the saponin.

In practice it is found that sugars giving a peak height of not less than 8 μA in the polarographic test do not normally flocculate on acidification. Surface-active materials influence the polarographic oxygen maximum and also influence foaming but the relatively minor effect on the latter of the methanol-soluble fraction of floc and of the bulk non-sugars is illustrated by the values for foaming index[5] shown in Table I.

Table I

Effect of non-sugars on foaming index

Additive		*Foaming Index 118°C*	
		Sugar A	*Sugar B*
No additive		96	124
Molasses	0·2%	95	115
Crude Saponin	5 p.p.m.	106	—
	20 p.p.m.	120	—
Oleanolic acid	5 p.p.m.	109	—
	10 p.p.m.	118	—

Sugar A was a normal production sugar, while sugar B was a specially selected low quality sugar with a very high foaming index. The total non-sugars in sugar B represent less than was present in the addition of 0·2% molasses to the foaming test, but this additive actually depressed the foaming indices of both sugars. The bulk non-sugars in the syrup film are therefore not responsible for the high foaming index of sugar B.

Sugar B flocculated after acidification, boiling and standing. The floc was removed by filtration, the methanol-soluble fraction was separated and found to represent the unusually high amount of 5 mg per kilo. Addition of either crude saponin or of oleanolic acid to the normal sugar A did increase the foaming index but, even when grossly excessive quantities were added, the effect was insufficient to raise the foaming index to the value measured for sugar B.

Clearly some other component exerts a greater influence on the foaming index than the methanol-soluble floc fraction.

Recrystallization and carbon treatment

In direct crystallization the reduction in bulk non-sugars between standard liquor and white sugar represents an elimination factor of some 200–300. The reduction in saponin and in methanol-soluble floc materials only represents an elimination factor

[1] CARRUTHERS *et al.: Paper presented to the 14th Tech. Conf. British Sugar Corp.*, 1961; *I.S.J.*, 1961, **63**, 285.
[2] HIBBERT *et al.: I.S.J.*, 1961, **63**, 306.
[3] EIS *et al.: Ind. Eng. Chem.*, 1952, **44**, 2844.
[4] WALKER and OWENS: *J. Agric. Food Chem.*, 1953, **1**, 450.
[5] PAINE *et al.: Ind. Eng. Chem.*, 1924, **16**, 1252.

of about 20[1]. If the same elimination factors were obtained on recrystallizing the sugar, to give a raffinade sugar, then a single stage elimination factor of only 20 corresponds to an overall elimination factor of 400 for the two-stage crystallization and this should be sufficient to reduce the non-sugars to negligible proportions.

In practice, even with low quality sugars, it has been found that recrystallization eliminates the components which give rise to acid floc but, although both the polarographic value and foaming characteristics were greatly improved, this improvement was not as great as could be obtained by treating the low quality sugar with a small amount of powdered carbon before recrystallization. Since surface-active material is absorbed on to the carbon then, if this material could be recovered from the carbon, this procedure would prove a means of concentrating the minute amounts of surface-active material for further investigation.

It was found that surface-active material could be recovered from the carbon by treatment with boiling glacial acetic acid. This procedure was originally adopted because hot glacial acetic acid was used by WALKER[6] to elute saponin from filter-aid.

Preparation of foaming extract

A 67°Bx solution of 20 kg of a foaming sugar was treated at 80°C with 40 g (0·2% on sugar) of "Norit ZN plus". After 30 minutes contact time, 40 g of "Hyflo Supercel" was added and the mixture of carbon and filter-aid was filtered off and washed with water. The final washings, although showing zero polarization, still gave a positive Molisch reaction. The spent carbon was then eluted with four 500-ml portions of boiling glacial acetic acid. Further elutions were found to yield only negligible amounts of foaming components. The eluates were bulked and evaporated to dryness under reduced pressure, water being added several times to complete the removal of acetic acid. The residue was then extracted with 40 ml of water and centrifuged; a small amount of brown insoluble matter was discarded and the clear brown aqueous supernatant was used in subsequent tests.

For comparison the same procedure was applied to 20 kg of a low-foaming sugar.

The effect of the carbon treatment on the foaming characteristics of the original sugars is recorded in Table II and the effect of adding small quantities of the extracts to a low-foaming sugar is shown in Table III.

Table II

Absorption of foaming material on carbon

	Foaming sugar	*Low-foaming sugar*
Untreated sugars		
Foaming Index at boiling point	103	90
Foaming Index at 118°C	103	65
After carbon treatment		
Foaming Index at boiling point	85	90
Foaming Index at 118°C	63	66

Table III

Addition of carbon extract to a low-foaming sugar

	Addition of extract to 50 g sugar			
Source of extract	*None*	*0·1 ml*	*0·2 ml*	*0·4 ml*
Extract from foaming sugar				
Foaming Index at boiling pt.	90	93	109	173
Foaming Index at 118°C ..	69	80	89	105
Extract from low-foaming sugar				
Foaming Index at boiling pt.	90	90	86	88
Foaming Index at 118°C ..	69	68	68	67

The results for the low-foaming sugar show that the carbon treatment did not change the foaming characteristics and the extract from that carbon did not induce foaming when added to low-foaming sugar.

Carbon treatment of the foaming sugar produced a syrup with very low foaming characteristics and foaming components from this sugar were present in the extract.

The saponin content of the foaming extract estimated by the method of WALKER[6] was $< 80\mu g$ in 40 ml. It was therefore clear that the foaming potential was due to components other than saponin.

Fractionation of foaming extract on "Sephadex"

In order to classify the extract in terms of molecular size, 4 ml of foaming extract (equivalent to 2 kg of sugar) was fractionated on a 68 × 1·5 cm column of "Sephadex G25", having an exclusion limit for compounds of about 5000 molecular weight. At 30 minute intervals, 8-ml fractions were collected and the foaming characteristics of each fraction were tested by measuring the foaming index[5] when 1 ml of each fraction and 24 ml of water was added to 50 g of a low-foaming sugar. The effect on the polarographic oxygen maximum was also examined by measuring the peak height when 1 ml of each fraction was added to 13 g of sugar together with 5 ml 0·01M potassium sulphate and the solution was made up to 50 ml.

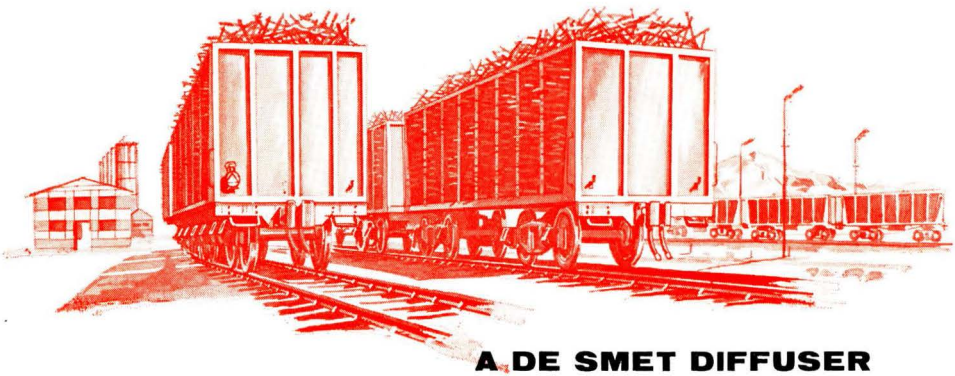
The results are recorded in Table IV.

Table IV

"Sephadex G25" fractionation of foaming extract
Effect on the foaming index and polarographic peak height obtained by adding 1 ml of each fraction to a low-foaming sugar

Fraction	*Foaming index* B.P.	118°C	*Polarographic peak height* (μA)	*Carbohydrates in fraction*
1	84	61	10·8	Nil
2	88	61	10·0	,,
3	89	61	10·0	,,
4	95	61	10·4	,,
5	89	61	10·8	,,
6	110	66	8·9	Levan (trace)
7	128	90	4·9	Levan (trace)
8	109	62	8·4	Nil
9	94	62	9·5	,,
10	100	65	9·4	Raffinose (trace)
11	88	60	8·8	Raffinose, sucrose and invert
12	94	67	8·8	,,
13	89	65	8·6	,,
14	89	60	7·6	Sucrose (trace)
15	85	61	8·8	Nil

[6] *J. Amer. Soc. Sugar Beet Tech.*, 1956, **9**, 233.
[7] CARRUTHERS *et al.*: *I.S.J.*, 1963, **65**, 234, 266.



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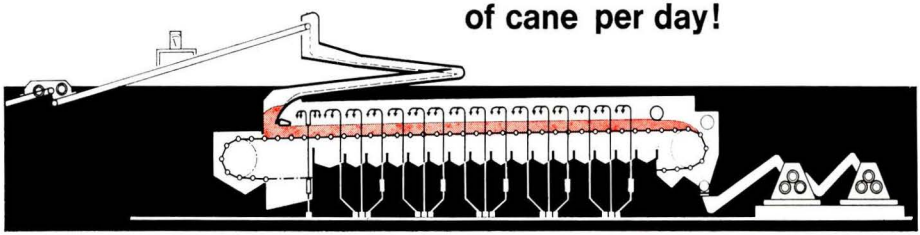
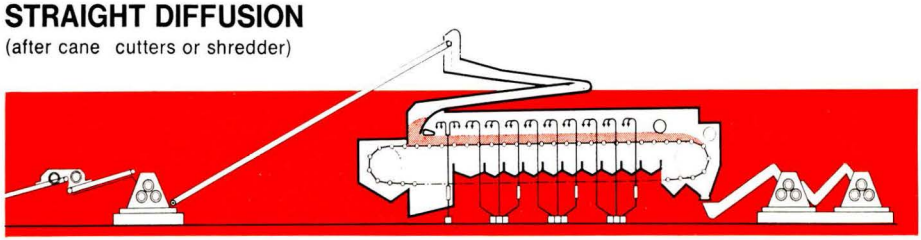
from 1000 to 8000 tons
of cane per day!



STRAIGHT DIFFUSION
(after cane cutters or shredder)



SHORT DIFFUSER
(after first mill)

97 % yield of sucrose
without increase of imbibition

- lower investment
- higher production
- reduced horse power
- reduced maintenance

DE SMET

CONTINUOUS PROCESSES

EXTRACTION DE SMET ANTWERP - BELGIUM

265, av. Prince Baudouin, Edegem-Antwerp-Cables Extraxsmet Antwerp

Carbohydrates in the fractions were identified by thin-layer chromatography[7].

The results show that fraction 7 affected both the foaming index and polarographic oxygen maximum. This fraction contained no free amino acids but, after hydrolysis in 50% hydrochloric acid for 16 hours at 110°C, the hydrolysate was shown by paper chromatography and electrophoresis to contain at least 12 amino acids, indicating the presence of peptide material.

This sample also contained levan, but whereas the strong hydrolysis to degrade the peptide eliminated the foaming effect of this fraction, as shown in Table V, a mild hydrolysis for 30 minutes in 0·1N hydrochloric acid at 100°C hydrolysed the levan but had little effect on the foaming characteristics.

Table V

Effect of selective hydrolysis on foaming characteristics of fraction 7
Influence on the foaming index of a low-foaming sugar

Additive	*Foaming index*	
	B.P.	118°
No additive	85	66
Fraction 7	119	91
Fraction 7 after mild hydrolysis	104	91
Fraction 7 after strong hydrolysis	89	70

Fig. 1 records the amino acids produced by strong acid hydrolysis of the fractions from "Sephadex G25" in a parallel experiment. The amino acids were separated by high voltage paper electrophoresis in 1·5M formic acid : 2M acetic acid[8].

In this fractionation, fraction 6 did not cause foaming and yielded no amino acids on hydrolysis. Fraction 7 induced maximum foaming and electrophoresis showed that this fraction contained the highest peptide concentraction, while fraction 8 induced less foaming and had a lower peptide content.

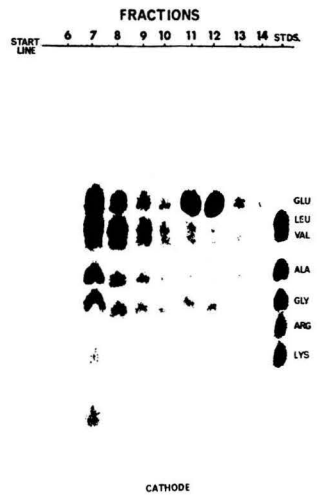


Fig. 1. Electrogram of hydrolysed G-25 fractions

Fractions 11 and 12 contained large amounts of glutamic acid after hydrolysis and the production of this amino acid superficially resembles peptide hydrolysis but was not in fact due to peptide. These fractions were found to contain pyrrolidone carboxylic acid; this anhydride of glutamic acid is absorbed by carbon but, having a low molecular weight, the pyrrolidone carboxylic acid was separated from the peptide on G25 to yield glutamic acid on hydrolysis of fractions 11 and 12. Fractions 9 to 14 had very little effect on the foaming index.

It was concluded that the peptide was associated with the foaming effect.

(To be continued)

Superheating Effects on Sucrose Crystallization under Ebullition Conditions

By M. C. BENNETT and Y. L. FENTIMAN

(Tate & Lyle Limited, Research Centre, Westerham Road, Keston, Kent, England)

Paper presented to the 13th General Assembly of the Commission Internationale Technique de Sucrerie (C.I.T.S.), 1967

PART I

INTRODUCTION

MOST research into sucrose crystallization is directed ultimately towards an improvement in sucrose quality. Since the inclusion of impurity is a direct result of crystal growth, it is clear that the quantity of impurity within a crystal can have significance only if the growth manner is known. The experimental procedures which have been used to study impurity inclusion can be divided roughly into two kinds, each of which has an important failing:

(i) Boilings have been carried out in laboratory pans modelled on the full-scale plant, so that while the environmental conditions have approximated to those of the commercial pan, the crystallization has never reached a steady state and the rate has varied throughout the period of impurity inclusion.

[8] GROSS: *Nature*, 1955, **176**, 72.

(ii) The crystallization has been carried out in a special apparatus under carefully controlled (non-boiling) conditions, and observations have been made on only a few sucrose crystals. Here at least the inclusion of impurity can be followed as a function of the crystallization process and comparisons made under identical conditions of, for example, rate or supersaturation. However, it is doubtful that the behaviour in such systems is the same as that in a population of crystals under the ebullition conditions of the vacuum pan.

From these considerations it appeared that progress in this field would depend upon the development of a steady state crystallizer operating under realistic ebullition conditions. Several attempts were made, without success, to build a laboratory-scale continuous crystallizer but finally attention was turned to a reflux system based on boiling point control. This system, which was first set up in this laboratory by R. J. BISHOP, has now been developed into a reliable working method for studying the crystallization of sucrose under constant conditions of temperature, pressure and concentration. The operation of the crystallizer and determination of crystallization rate are described below and some important preliminary findings concerning the effect of superheating are reported.

EXPERIMENTAL

The crystallizer consists of a 500-ml round-bottom flask fitted with a reflux condenser as shown in Fig. 1.

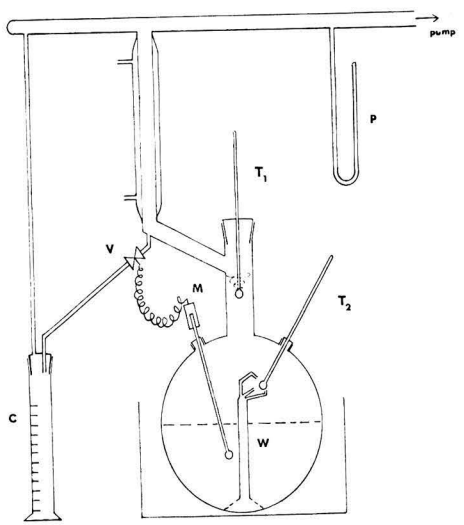


Fig. 1.

The flask operates under reduced pressure which is controlled by a cartesian diver manostat backed by a constant flow water pump. The pressure remains constant, within 0·2 mm Hg of any required value as indicated by the manometer P, which is separated from the condenser by a liquid nitrogen trap (not shown) to prevent passage of water. With the valve V closed and the pressure constant, any solution in the flask boils under reflux at a constant temperature. The flask was originally heated by an electric mantle but this has now been replaced by a boiling water bath; an air leak (not shown) ensures smooth ebullition and high turbulence within the flask. Condensate can be drawn off into the calibrated cylinder C through a magnetic valve V, which is controlled through a relay by the mercury contact thermometer M in the boiling massecuite.

To determine a crystallization rate, seed crystals are introduced under the same pressure as that of the flask, through a special side arm (not shown) into the boiling supersaturated solution. As the seed crystals grow, the concentration in the mother liquor decreases together with its boiling point. When the boiling massecuite temperature has decreased by 0·1°C the mercury contact thermometer M activates a relay and valve V opens, allowing condensate to leave the hitherto closed system. Hence the concentration and the boiling temperature in the flask rise; when the temperature has risen 0·1°C, the valve is closed and the cycle is repeated. Since the temperature and the pressure are essentially constant, the concentration (supersaturation) remains constant and hence the rate of collection of water indicates precisely the rate of crystallization under the conditions in the flask.

Determination of Specific Rate

For a mass of crystals M of total surface area A, the rate of deposition of sucrose is given by

$$\frac{dM}{dt} = VA$$

where V is the specific crystallization velocity.
For a single crystal of mass m and surface area a

$$a = \alpha m^{\frac{2}{3}}$$

where α is the shape factor and has the dimensions of $(\text{density})^{-\frac{2}{3}}$.

For n crystals, of total mass M,

$$A = na = n^{\frac{1}{3}}\alpha(mn)^{\frac{2}{3}}$$
$$= n^{\frac{1}{3}}\alpha M^{\frac{2}{3}}$$

and $$\frac{dM}{dt} = V n^{\frac{1}{3}} \alpha M^{\frac{2}{3}}$$

Integrating with respect to M between the limits $t = 0$ and $t = t$

$$t = \frac{3}{n^{\frac{1}{3}} \alpha V}(M^{\frac{1}{3}} - M_o^{\frac{1}{3}})$$ where M_o = Mass of Seed.

Hence a plot of t vs. $M^{\frac{1}{3}}$ should be linear with intercept $M_o^{\frac{1}{3}}$ and slope $\frac{3}{n^{\frac{1}{3}} \alpha V}$ from which the specific velocity V can be calculated.

KUKHARENKO[1] using very large crystals of sucrose weighing from 150 to 2500 mg measured surface areas and evaluated the shape factor

$$\alpha_k = 4{\cdot}12 \pm 0{\cdot}05$$

[1] *La. Sugar Planter and Manuf.*, 1928, 80 and 81.

VERNON[2] carried out similar measurements on 9 small crystals and using an independent measure of density calculated

$$\alpha_v = 4{\cdot}55 \pm 0{\cdot}12$$

In the work reported here the crystals were much less well defined and a cubic shape was assigned to them, for which

$$\alpha_c = 4{\cdot}41$$

It is interesting to note that the shape factors for the regular tetrahedron and sphere are

$$\alpha_t = 7{\cdot}19 \text{ and } a_s = 3{\cdot}49 \text{ respectively.}$$

Procedure

The first results were obtained using the following experimental procedure. Consideration of the results led to certain changes but these are described later.

(*a*) The total pressure was constant at 187–188 mm and the supersaturation was changed from run to run by changing the setting of the mercury contact thermometer, i.e. by changing the ebullition temperature, over the range 72·4–73·8°.

(*b*) The seed was 40 g of the sieve fraction 18–22 B.S.S. granulated sugar. By direct counting of known masses of this seed, the total number of seed crystals added (n) was $8{\cdot}1 \times 10^4$.

(*c*) A sucrose solution was prepared by adding 350 g of Tate & Lyle Pure Sucrose to 150 ml distilled water. This was heated under the reduced pressure to its ebullition temperature, at which it was undersaturated. The solution was boiled under reflux for 30 min to ensure complete dissolution.

(*d*) Condensate was then withdrawn through the valve until the boiling temperature was 0·5–1·0°C lower than that required for the experiment. The seed crystals were then added.

(*e*) With the valve open, more condensate was withdrawn until the required ebullition temperature (and hence supersaturation) had been reached. From this point the rate of withdrawal of condensate was recorded, the experiment being continued until about 25 ml had been collected; this was equivalent to the deposition of approximately 100 g sucrose.

(*f*) At the end of the experiment, the vacuum was released and the heater switched off. Two samples of the mother liquor were taken immediately using a pipette fitted with a detachable sintered glass filter to prevent passage of crystals. A weighed quantity of the liquor was diluted and the sucrose concentration determined from the refractive index.

(*g*) The remainder of the massecuite was poured into a 300 ml basket centrifuge and the mother liquor separated at 1000 *g*. The crystals were given a brief wash with a distilled water spray before removal for examination. The number of crystals in the product was generally within 10% of the number in the seed.

RESULTS AND DISCUSSION

Fig. 2 shows the t *vs.* $M^{\frac{1}{3}}$ plots at two concentrations 79·74 and 80·05 g/100 g solution; the ebullition temperatures were 72·8 and 73·4°C respectively. The few runs in which this plot was not linear were discarded. The non-linearity was always traced to either false graining or conglomeration as shown by visual inspection and a crystal count on the product. Using $n = 8{\cdot}1 \times 10^4$, $\rho = 1{\cdot}59$ g/c.c. and the shape factor for a cube, the specific crystallization velocities were found to be 5·7 and 10·7 g/sq.cm./min respectively. The intercepts ($M_0^{\frac{1}{3}}$) for both lines in Fig. 2 are close to the expected value (3·42) for the initial mass of seed (40 g). The agreement is not perfect because the seed was introduced at a supersaturation slightly lower than that of the experiment and had therefore grown slightly before the constant conditions were attained.

In Fig. 3, line (i) shows a plot of the specific velocity against the supersaturation ratio S, where S is the actual mass ratio of sucrose to water at T_m°C, divided by the mass ratio of sucrose to water for a saturated solution at T_m°C, i.e.

$$S = \left(\frac{\text{mass of sucrose}}{\text{mass of water}}\right) \Bigg/ \left(\frac{\text{mass of sucrose}}{\text{mass of water}}\right)_{T_m\,°C}$$

for saturation as at T_m°C.

Values for the sucrose concentration at saturation were taken from the average values of VAVRINECZ[3] and the supersaturation ratio calculated as S_v. The points in Fig. 3 show a considerable scatter and

[2] Ph.D. Thesis, University of London, 1938.
[3] *Zeitsch. Zuckerind.*, 1962, **87**, 486.

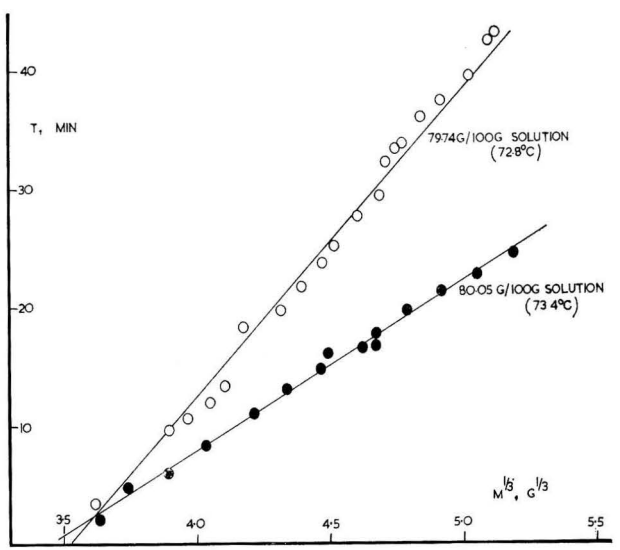


Fig. 2.

line (I) was drawn from a least squares analysis. However the intercept shows zero rate close to S_v = 1·1 and in two experiments at supersaturations $1{\cdot}0 < S_v < 1{\cdot}1$ the seed crystals were seen to dissolve.

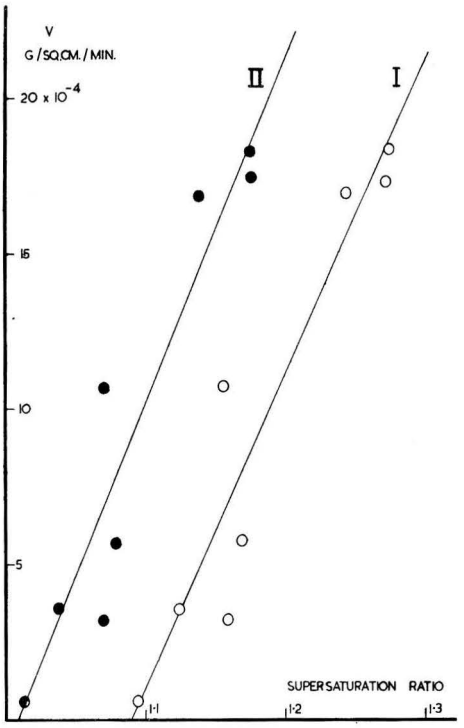


Fig. 3.

It appeared that the solubility of sucrose under the ebullition conditions in the crystallizer was somewhat greater than the published value determined under non-boiling equilibrium conditions.

The following experimental procedure was adopted to determine the actual solubility of sucrose under the experimental conditions of the refluxing crystallizer:

(*a*) Undersaturated sucrose solution was boiled under reflux at a lower pressure (temperature) than required for the determination. Excess crystals were added and the pressure raised to the required value. The system was refluxed at constant pressure, the ebullition temperature rising as sucrose dissolved. When the temperature had remained constant for 1 hour the liquor was sampled in the normal way.

(*b*) A highly supersaturated solution was prepared by withdrawing condensate until spontaneous nucleation set in. The pressure was now reduced to the required value and the closed system boiled under reflux. The ebullition temperature decreased as sucrose crystallized out until equilibrium was reached at the fixed pressure. When the temperature had remained constant for 1 hour, the liquor was sampled as before.

Results are shown in Table I which also gives the VAVRINECZ[3] values.

Table I. Solubility of sucrose (g/100 g solution) under ebullition and non-boiling equilibrium conditions.

Temperature °C	(*a*) *From undersaturation*	(*b*) *From oversaturation*	*Mean (ebullition)*	VAVRINECZ[3] *(non-boiling)*
68	77·33	77·53	77·43	76·03
70	77·42	78·16	77·79	76·48
72	77·77	77·85	77·81	76·92
74	78·80	78·95	78·88	77·36
76	79·42	79·60	79·51	77·81
78	79·61	79·94	79·78	78·24
80	80·26	80·45	80·36	78·68
84	81·39	—	81·39	79·53

Further experiments were carried out using the same apparatus at atmospheric pressure when ebullition could not occur in the required temperature range. Solubility determinations carried out by the same procedures as in (*a*) and (*b*) using 3 and 5 hour equilibrium times, gave values always within the range of those averaged by VAVRINECZ[3]. The results in Table I show clearly that in the crystallization experiments described above, the saturation concentration of sucrose was approximately 1·5 g sucrose/100 g solution greater than expected from VAVRINECZ's values. Thus the values for supersaturation, S_v, quoted in Fig. 3 are incorrect, and new values, S, must be calculated using the mean ebullition solubility data from Table I. The plot of specific crystallization velocity against the true supersaturation, S, for the particular set of experimental conditions, is shown in Fig. 3 by line (II), drawn from a least squares analysis.

The difference in the solubilities determined under ebullition and non-boiling equilibrium conditions is due to the superheating which is necessary to maintain a fast boiling rate, and the magnitude of the effect changes with the degree of superheat. Thus when the electric mantle (operating at, say, 200°C) was replaced by a boiling-water bath, the rate of boiling in the massecuite was only slightly reduced (the higher temperature of the mantle was compensated by the poor thermal contact). The solubility of sucrose under ebullition conditions changed only slightly as shown at various temperatures in Fig. 4. A much larger change towards the non-boiling equilibrium values was found when the water bath was cooled to only 10°C above the required temperature in the massecuite. The solubility curve for this system is also shown in Fig. 4, where the data from Table I provide the limiting solubilities.

To account for the superheating effect two possibilities must be considered: (1) an effect due to a temperature gradient at the heated wall of the crystallizer (2) a more general vapour nucleation effect common to all rapidly boiling liquids.

(1) From Fig. 4 it is seen that, at constant concentration, the maximum difference in saturation temperature is 6°C. This difference might arise through the existence of a large temperature gradient at the heated wall of the crystallizer. In a pocket of massecuite in the vicinity of the wall sucrose would tend

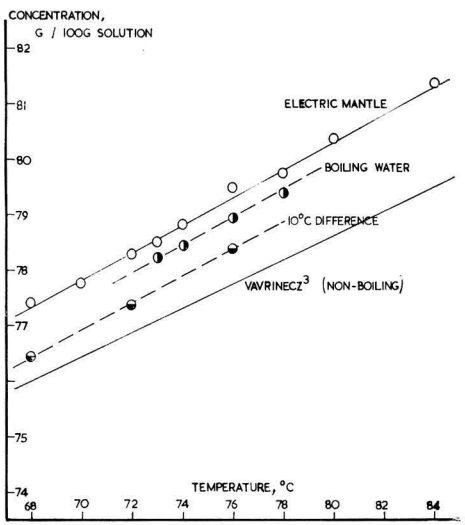


Fig. 4.

to dissolve, recrystallizing again as the pocket of liquor passed away into the cooler regions in the bulk of the massecuite. Owing to the considerable difference between the rates of dissolution and crystallization[4], the concentration of sucrose in the mother liquor would tend to be somewhat greater than that at equilibrium. Clearly, an inside wall temperature at least 6°C greater than that of the bulk would be necessary to account for the solubility change. With the electric mantle the maximum temperature rise at the wall, using a mercury thermometer, was 2·4°C. W. M. NICOL in these laboratories has recently found that a thermocouple on the glass wall shows a rather greater temperature rise, and further investigation is clearly necessary.

(2) Owing to the fast rate of vapour formation, the solution will not be in equilibrium with the vapour phase and the solution will be superheated above its boiling point. In a constant pressure system, the superheating causes a large change in concentration; this effect will now be considered in detail.

(To be continued)

Brevity

Bulk handling project for Brazil[5].—The Brazilian Instituto do Açucar e do Alcool is to invite tenders for the construction of a sugar storage and bulk ship loading complex in Maceio. A consortium headed by a Brazilian engineering firm recently won a bid for the construction of a similar complex in Recife. The Recife complex storage capacity is for 200,000 metric tons of raw sugar and 100,000 hl of molasses. Its cost is estimated at 26·4 million new cruzeiros. Automatic bulk loading equipment will load a ship in 30 hours instead of the 15 days it takes now. Construction is to be completed in 26 months. The complex planned for Maceio will have the same sugar storage capacity but double the molasses storage capacity.

Correspondence

The Editor,

The International Sugar Journal.

Sir,

THE DIRECT POLARIMETRIC DETERMINATION OF SUCROSE IN THE PRESENCE OF GLUCOSE AND FRUCTOSE BY ADDITION OF BORAX

In his letter[6] on the above subject, J. LÓPEZ HERNÁNDEZ quotes some of my early electrophoretic results in support of his theory that no significant complexing of sucrose occurs in the presence of borate ions.

In point of fact, electrogram C in the quoted publication[7] demonstrates distinctly the differences between strongly complexed sugars such as fructose, weakly complexed sugars such as sucrose and non-complexed sugars such as compound II_2 (neo-kestose). The latter shares the inability to form an anionic complex with 2,3,4,6-tetra-O-methyl-D-glucose, a compound often used as non-migrating marker to measure the electro-osmotic effect.

The mobilities of sugar-borate complexes vary with the ionic strength and pH of the borate solution used. The shift of the sucrose spot in the electrogram towards the cathode is the result of electro-osmotic effect and capillary flow of liquid in the paper, counterbalanced to some degree by the anodic migration of the sucrose-borate complex.

The small, but significant, complexing effect of the borate ion on sucrose makes possible the separation of sucrose from a number of other, less complexed, carbohydrates, viz. polysaccharides such as dextran, levan, inulin, and trisaccharides such as the kestoses.

I may add that it had been shown in this laboratory that the addition of borax to a normal sugar (sucrose) solution produced a drop in pol of 0·3°S.

It would therefore seem that both electrophoretic and polarimetric methods strongly indicate the formation of a sucrose-borate compound under the experimental conditions quoted.

Yours faithfully,

D. GROSS,
Tate & Lyle Ltd.,
Research Centre,
Keston, Kent, England.

[4] VANHOOK: "Principles of Sugar Technology", Vol. II. Ed. HONIG (Elsevier, Amsterdam) 1959, p. 183.
[5] *Public Ledger*, 21st October 1967.
[6] *I.S.J.*, 1967, **69**, 296.
[7] *Nature*, 1954, **173**, 487.

Sugar cane agriculture

Pokkah Boeng and top rot. C. G. HUGHES. *Cane Growers' Quarterly Bull.*, 1967, **30**, 81.—In Queensland both these diseases are prone to show up with the first violent flush of growth at the beginning of the wet season. The two diseases and their symptoms are described.

* * *

Cicadas cause damage. ANON. *Cane Growers' Quarterly Bull.*, 1967, **30**, 84.—Reference is made to the yellow cicada (*Parnkalla Muelleri*) causing ratoon failure on 14 acres at Klondyke on the Lower Burdekin in Queensland. Some control experiments against the pest are described.

* * *

Standover crops and early ratooning. C. L. TOOHEY. *Cane Growers' Quarterly Bull.*, 1967, **30**, 87–88.—The need for a return to the practice of growing some standover or two-year-old cane is pointed out. Its value is for early cutting and it gives good yields and high sucrose juice. A warning is given about ratoon crops from such cane not developing well. Reasons for this are given.

* * *

Adaptation of varieties. J. H. BUZACOTT. *Cane Growers' Quarterly Bull.*, 1967, **30**, 101–103.—The changes that have taken place in popularity of different sugar cane varieties in Queensland in recent years are discussed. Two important factors responsible for many of the changes are the advent of mechanical harvesting and the use of much marginal land for cane cultivation.

* * *

Q 85 has high sugar potential. I. T. FRESHWATER. *Cane Growers' Quarterly Bull.*, 1967, **30**, 104–105. This new variety for the Burdekin area, the latest cane to receive a "Q" number, is described in detail. Yield and sugar content are excellent, early growth is fast, arrowing sparse and ratooning satisfactory. It does not appear to pose any serious disease risks.

* * *

Hybridization of sugar cane with other genera. J. M. JUANTORENA. *Bol. Ofic. A.T.A.C.*, 1966, **21**, (3), 20–23. The possible or potential value of crosses between sugar cane (*Saccharum*) and certain other allied genera is discussed, particularly in relation to the search for more disease-resistant varieties (notably mosaic disease-resistant) and varieties that reach maturity early. Details are given of hybrid seedlings obtained during the 1963–64 season in crossing various sugar cane varieties with species of *Erianthus* and *Sorghum*.

Sugar cane research in Cuba at the present time. F. DÍAZ B. *Bol. Ofic. A.T.A.C.*, 1966, **21**, (2), 43–49. The activities of the Sugar Cane Research Institute in Cuba are described, including hybridization and selection work for the production of improved varieties. Some 21 varieties, of which half are new Cuban selections, have been chosen for their suitability for mechanical harvesting and appropriate early, midseason and late maturity.

* * *

A study of tractor accident prevention. G. MCDONALD. *Producers' Rev.*, 1967, **57**, (1), 49–53.—Various lines of investigation or research in regard to tractor performance and accidents to operators are discussed. Overturning remains the largest factor, accounting for 60% of tractor fatalities. In Australia there are some 300,000 tractors which annually kill about 100 persons and injure 8000. Tractor deafness and spine troubles are also discussed.

* * *

Cairns growers active on stone picking problem. ANON. *Producers' Rev.*, 1967, **57**, (1), 61.—A description (with photographs) is given of an interrow stone picker or gatherer recently developed locally for use in cane fields. It is towed and powered by a tractor.

* * *

Field testing of sugar cane seedlings under Florida Everglades conditions. B. A. BOURNE. *Sugar J.*, 1967, **29**, (8), 11–13.—Reasons why the bunch system of planting out sugar cane seedlings is not favoured in Florida are given. An improved field planting technique, whereby 2230 plants per acre are established, in place of 1450, is described. This represents a 53·8% increase in the number of seedlings handled per acre.

* * *

Florida sugar cane variety census for 1966. L. P. HEBERT. *Sugar J.*, 1967, **29**, (8), 24–26.—A résumé is given of this recently completed census. The amount of land under cane was 190,000 acres. Three varieties (Cl.41-223, CP 50-28 and Cl.47-83) occupied 85·49% of the land under cane. Details are given of a number of varieties cultivated in the area.

* * *

Weed control: a problem in plant ecology. G. ARCENEAUX. *Sugar J.*, 1967, **29**, (8), 29–31.—The writer discusses weed problems in sugar cane from an

ecological angle and puts forward some novel and interesting suggestions in regard to weed problems and long-range control in Louisiana and Florida. The possibility that grass weeds, such as Johnson grass, have some connexion with the greatly increased incidence of mosaic disease is discussed.

* * *

Efforts to harvest Florida recumbent cane. J. E. CLAYTON and H. D. WHITTEMORE. *Sugar J.*, 1967, **29,** (8), 51–55.—Most mechanical harvesters cannot operate on the loose peaty soils of Florida; wheels spin round or cane is pulled out by the roots. As hand labour, imported from Jamaica to harvest the crop, becomes more expensive and difficult to obtain, the need for mechanical harvesting becomes more urgent. Modifications tried on various existing forms of machinery are described. None was entirely satisfactory.

* * *

Introduction of new varieties of cane to Pernambuco. A. A. DE SOUZA LEAO. *Brasil Açuc.*, 1967, **69,** (1), 33–34.—The difficulties of establishing new varieties are referred to and the damage caused in recent years by the "cigarrinha" pest (*Mahanarva indicata*) is discussed. The names of new varieties which show promise and which may supplant the existing widely cultivated variety (Co 331) are given. They are: CB 47-15, CB 45-155, IANe 51-17 and IANe 55-33.

* * *

Green manure plants for cane lands. P. DE OLIVEIRA LIMA. *Brasil Açuc.*, 1967, **69,** (1), 35–39.—The advantages of green manuring on fallow cane fields, especially in building up the nitrogen and humus content of the soil, are pointed out. A list is given of 18 leguminous green manure plants or crops, along with information on the best time for planting, seeding rate, and type of inoculant to use.

* * *

Insect pests of sugar cane in Uttar Pradesh and their control. H. SINGH. *Indian Sugar*, 1966, **16,** 697–702. The more important sugar cane pests and the nature of the damage they cause are described. Accepted control measures are indicated. The pests include the termite, shoot borer, root borer, black bug, army worm, pyrilla, white grub, top borer, Gurdaspur borer and white fly.

* * *

Sugar cane production in Egypt. I. E. STOKES, S. SIOUFI and M. HASHEM. *Sugar y Azúcar*, 1967, **62,** (3), 34–35.—A general account of the Egyptian sugar cane industry, illustrated with photographs, is given. Sugar cane is grown in the Nile valley in a region stretching a thousand miles, the soil being fertile, the terrain flat and well suited to prevailing furrow irrigation. The two main varieties are Co 413 and N:Co 310, the latter being favoured where cold injury may occur. The main diseases are mosaic, streak and ratoon stunting disease. Two borers, one of which is *Sesamia cretica*, cause much damage.

* * *

The fight against the borer in Cuba. ANON. *Cuba Economic News*, 1967, **3,** (19), 6.—The sugar cane borer is the worst sugar cane pest in Cuba. Up to 31st October 1966 more than 4,100,000 *Lixophaga* flies (parasitic on the borer) had been released. In 1966 breeding of the flies showed a 17% increase over 1965. Another parasitic fly, *Paratheresis claripalpis*, which it is hoped will be more effective, is also being bred for release. The wax moth (*Galleria mellonella*) is being used as a host in breeding both insects in addition to the cane borer.

* * *

Accolade for N:Co 310. O. WHITEHEAD. *S. African Sugar J.*, 1967, **51,** 112–115.—This variety of sugar cane, raised in Natal and first released for commercial cultivation in 1945, is probably the most extensively grown commercial variety throughout the world today, being grown commercially in at least 19 different cane-growing countries. Nowhere has it proved so popular or important as in Taiwan. The recent erection in Taiwan of a bronze statue of a Taiwan farmer holding a bundle of N:Co 310 cane in his arms is described and illustrated.

* * *

Why lose your top soil? ANON. *Victorias Milling Co. Expt. Sta. Bull.*, 1966, **13,** (11 & 12). 4–7, 11.—The loss of valuable top-soil that may take place in sugar cane fields during the rainy months of the year is discussed. Field or cultural conditions that can cause severe soil erosion are pointed out and methods to be adopted to minimize them are discussed.

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Performance of sugar cane varieties from experiments in the Victorias Milling Company District from 1959-1964. T. R. ESCOBER and M. V. LACSON. *Proc. 13th Ann. Conv. Philippines Sugar Tech.*, 1965, 13–24. Selection work with a wide range of varieties is described on the basis of yield, sugar content, agronomic characters and disease resistance. The six varieties selected as suitable for commercial cultivation are: Phil. 54-60, B 37172, Co 440, B 4362, B 41227 and CP 29-116. Details regarding each are given.

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Persistence of "Aldrin" and "Dieldrin" in soils. F. A. MACLANG. *Proc. 13th Ann. Conv. Philippines Sugar Tech.*, 1965, 25–32.—The function of these two related chlorinated hydrocarbon insecticides is discussed. Results of experiments on their behaviour or disappearance in different types of soil, with varying amounts of organic matter, are given. It was found that they did not accumulate in the soil and were not significantly affected by leaching, and also that they were metabolized by micro-organisms and ultraviolet light.

Combating "cigarrinha" sugar cane pest in Brazil. ANON. *Brasil Açuc.*, 1967, **69**, (2), 3–5.—Reference is made to the inauguration of a campaign and the allocation of special funds to combat the serious insect pest of sugar cane, *Mahanarva indicata* ("cigarrinha"), especially troublesome in parts of Pernambuco.

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Control of ratoon stunting disease. F. O. BRIEGER. *Brasil Açuc.*, 1967, **69**, (2), 40–43.—This serious disease of sugar cane is discussed and directions are given in regard to hot water treatment of planting material. In Brazil this commonly results in an increase in cane yield of 40%.

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Soil acidity in relation to sugar cane cultivation. P. DE OLIVEIRA L. *Brasil Açuc.*, 1967, **69**, (2), 44–46. The advantages of using lime on some soils in Brazil, both heavy and light, for sugar cane cultivation are discussed.

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Botanical characteristics of some sugar cane varieties in the early stages of growth. P. S. MATHUR and D. R. SINGH. *Indian Sugar*, 1967, **16**, 751–761.—The morphological characters of cane varieties approved for cultivation in Uttar Pradesh in the early stages of growth were studied in the hope of finding methods of distinguishing or identifying varieties in the early stages of growth.

* * *

Q 80 approved for Herbert River district. ANON. *Producers' Rev.*, 1967, **57**, (2), 6.—This new variety, a cross between Q 67 and the Puerto Rican variety M 336, is described and its good qualities pointed out. It is regarded as commercially resistant to most diseases, although attractive to rats.

* * *

Irrigation—a place for aluminium tubes. A. M. SHARP. *Producers' Rev.*, 1967, **57**, (2), 21.—Increased irrigation has resulted in increased use of aluminium irrigation tubes, favoured because of their lightness, durability and corrosion resistance. Precautions to prevent pitting or corrosion are given.

* * *

New dual purpose harvester. ANON. *Producers' Rev.*, 1967, **57**, (2), 23.—A new version of the Toft model J 150 harvester is described. It can be operated as a whole-stalk or chopper harvester and is claimed to be the first commercial machine that can operate under either system.

* * *

Improved cane varieties. ANON. *Producers' Rev.*, 1967, **57**, (2), 27.—A list is given of sugar cane varieties approved for planting during 1967 and the various districts or mill areas to which they apply. There is also a separate list of approved fodder canes.

NA 56-62—a sugar cane variety superior to CP 48–303. F. G. LOPEZ. *La Ind. Azuc.*, 1967, **72**, (878), 25–26.—An account is given of the new variety NA 56-62, which gives a much higher yield than CP 48–103, the commercial variety it may replace.

* * *

Control of annual weeds, Raoul grass and Bermuda grass. ANON. *Sugar Bull.*, 1967, **45**, 150–152.—Programmes with chemical weedkillers, notably TCA, "Fenac" and "Dalapon", are suggested. In experimental plots flaming was successful with weeds that survive chemical treatment, provided weeds were not more than 4 inches high.

* * *

Photography in cane harvester research. J. E. CLAYTON and H. D. WHITTEMORE. *Sugar J.*, 1967, **29**, (10), 20–21.—A brief description is given of high-speed photography used as a technique to study the action of the cutting blades on the cane stalks and the reaction of the root system to being cut.

* * *

Harvesting the 1966 frozen cane crop. L. L. LAUDEN and R. T. GIBBONS. *Sugar J.*, 1967, **29**, (10), 11–15. It is explained how the freeze-damaged crop was successfully harvested because of excellent co-operation among factory owners and growers. Much was due to the good topping practice of the latter, i.e. removal of the damaged top part of the stalks.

* * *

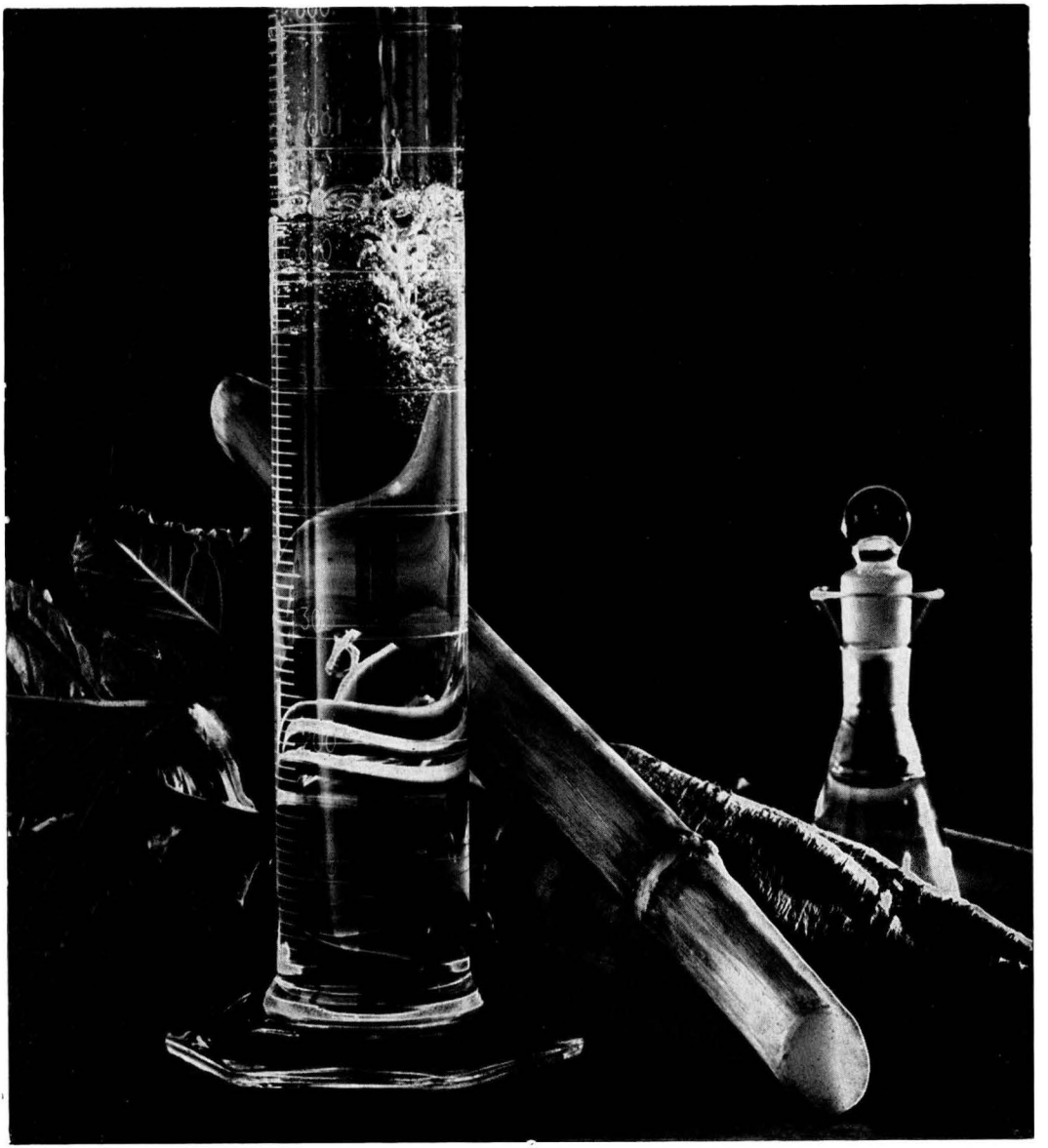
Studies to determine the spread of mosaic in programmes of direct hot-air treated and non-treated sugar cane. R. J. STEIB and S. J. P. CHILTON. *Sugar J.*, 1967, **29**, (10), 27–29.—Because of the belief among growers in Louisiana that seed cane that has received hot water treatment for control of ratoon stunting disease is more prone to mosaic disease than non-treated seed cane, comprehensive tests were carried out. An average of six tests at two locations showed no difference in the amount of mosaic disease found in plant cane and first ratoon from treated and non-treated seed cane.

* * *

The start of the 1967 cane crop: variety L60.25. L. L. LAUDEN. *Sugar Bull.*, 1967, **45**, 160.—Louisiana growers are reminded that the newly-released, early, high-sucrose variety L 60.25 should be rogued for mosaic disease. With heavy fertilizing (split nitrogen) the variety may be rapidly increased.

* * *

The reduction of field labour requirements through land grading. C. H. BURLEIGH. *Sugar Bull.*, 1967, **45**, 162–166.—The term "land grading" is used in Louisiana cane areas for all those practices employed to improve surface drainage. It is shown how the operation effects savings by reduced ditch and drain maintenance, reduced Johnson grass control costs and improved efficiency of mechanical operations. In eliminating surface drains, a greater area is provided for cane cultivation, resulting, naturally, in a higher yield per unit area.



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Sugar beet agriculture

The use of chemical herbicides in sugar beet cultivation. A. DONÀ DALLE ROSE. *Ind. Sacc. Ital.*, 1966, **59**, 249–257.—A large number of different herbicides are considered in relation to their use with sugar beet in Italy.

* * *

A severe necrotic disease of sugar beet caused by a strain of the beet mosaic virus. R. J. SHEPHERD, B. B. TILL and N. SCHAAD. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 97–105.—A description is given of a previously unrecorded or unusual strain of the beet mosaic virus first noticed in a sugar beet field near Davis (California). Tests with extracted sap showed that it was mechanically transmissable. Symptoms on beet and other host plants are given. The latter included some commonly cultivated plants such as dwarf or French bean, squash, okra, garden pea and spinach. From field and greenhouse experiments it is considered that this severe strain of mosaic possesses the potential of causing very serious losses if it should become widespread in commercial plantings. At present it is rare and of negligible economic importance.

* * *

Distribution of nitrate nitrogen in the blades and petioles of sugar beets grown at deficient and sufficient levels of nitrogen. J. D. KELLY and A. ULRICH. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 106–116. Sugar beet plants were grown in pots containing nutrient solutions with deficient and non-deficient amounts of N. After 96 days of growth the leaves were removed in order of age and analysed for nitrate N, blades and petioles having been separated. N deficiency occurred in young immature leaves even though there was an ample supply of N in the older leaves. This lack of rapid movement of nitrate N in sugar beet is considered unusual and is known not to occur in many other plants. It implies that a continuous supply of nitrate must be available to the sugar beet plant from the soil if nitrogen deficiency in the younger leaves is to be prevented.

* * *

Aphid control and planting date for the control of yellows of sugar beet. F. J. HILLS, W. H. LANGE, J. L. REED and R. S. LOOMIS. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 117–126.—Combinations of planting date and chemical control of aphids were evaluated over a three year period. Delaying planting time until early May did not necessarily result in escape from virus infection. The use of 3 to 5 properly timed "Metasystox" sprays on April planted beet showed much promise for improving beet production in the Sacramento Valley and north San Joaquin Valley areas.

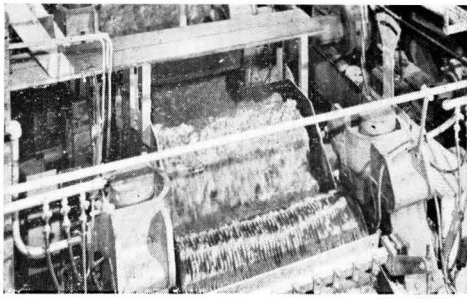
* * *

Maleic hydrazide and topping of overwintered sugar beets—a potential means of reducing the beet virus reservoir. R. J. SHEPHERD and B. B. TILL. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 138–141.—It is pointed out that in beet growing areas of California and elsewhere with mild winters it has become a common practice to overwinter large acreages of sugar beet for spring harvest. While this allows of more efficient utilization of processing facilities, it also contributes to increased incidence of beet virus where old and new plantings are present in the same area. It was found that maleic hydrazide markedly inhibited sprouting and re-growth of shoots. It was concluded that the use of maleic hydrazide on large acreages of overwintered beets may not be economically feasible, but it might be a useful means of reducing the reservoir of beet viruses where there are only a few overwintered fields.

* * *

Effect of aphid-borne beet yellows and beet western yellows on sugar beet seed production under conditions of varying fertility. O. A. HILLS, H. K. JEWELL, C. W. BENNETT and R. W. BRUBAKER. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 168–173.—Sugar beet seed plots fertilized to different levels were inoculated with beet yellows virus and beet western yellows virus to determine the effect of these viruses alone and in combination on the seed crop under different levels of nitrogen fertility. The inoculations were accomplished by artificially infesting the plots with viruliferous green peach aphids (*Myzus persicae*). A combination of BYV and BWYV resulted in a statistically significant decrease in seed production. Either virus alone tended to decrease seed production. Increasing nitrogenous fertilizers above the amounts commonly used by growers increased seed yields in the infected plots but were of little value in the yellows-free plots. Some reduction in seed germination accompanied the yellows infection. No statistically significant differences in the effect of BWYV and BYV on the beet seed crop were found.

Cane sugar manufacture



Automatic control device for the cane elevator of Central Tarlac. C. PAYONGAYONG. *Proc. 13th Conv. Philippines Sugar Tech.*, 1965, 319–322.—A description is given with a circuit diagram of the automatic cane elevator control at Tarlac in which the speed of the elevator is set either at zero, full speed or three intermediate speeds, depending on the load on the cane knife motors.

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Central Azucarera de Tarlac bagasse conveyor clutching system. F. P. RAMOS. *Proc. 13th Philippines Sugar Tech.*, 1965, 323–328.—Intermediate conveyors of the 23-roller tandem at Tarlac are driven through friction plate clutches which were engaged individually and manually. To improve their operation, an electro-pneumatic system was devised and applied during the latter part of the milling season. With the exception of some minor faults, operation was quite satisfactory. Details of the system are presented, together with diagrams.

* * *

Pilot plant for treatment of cane sugar waste. T. R. BHASKARAN and R. N. CHAKRABARTY. *J. Water Pollution Control Fed.*, 1966, **38,** 1160–1169; through *S.I.A.*, 1967, **29,** Abs. 88.—Waste water was treated in an anaerobic digester and then stabilized in an aerobic oxidation pond, with an overall BOD reduction of ~90%. The performance of the oxidation pond was improved by using algae which had been acclimated to the digester effluent in a culture tank, and by planting acclimated water hyacinths in the inlet bays.

* * *

Rôle of gummy matter and waxes in the crystallization of low-grade massecuites. S. L. PHANSALKAR and H. S. SRIVASTAVA. *Indian Sugar*, 1967, **16,** 747–748, 791.—Details are given of the methods used to determine the gum and wax contents in final molasses. The gum is extracted with 95% alcohol, dried to constant weight, ignited and the ash reweighed. The wax is determined by filtering a molasses solution to which potassium aluminium sulphate and potassium dihydrogen phosphate have been added, drying the filter cake, and extracting the wax from the cake with chloroform. The gum (alcohol-precipitable matter) and wax contents were found to be 0·34–0·50% and 0·32–0·55% be weight, respectively, in carbonatation molasses, and 0·52–0·88% and 0·50–0·89%, respectively, in sulphitation molasses. Experiments with an artificial massecuite prepared from *B* heavy molasses and sugar (7:3), which was pan boiled and then retained in a crystallizer for 6 hr before centrifugalling, showed that the molasses apparent purity rose with increase in the gum and wax contents. The crystallization rate fell with increase in gum content, e.g. by 2·42% and 5·54% with 0·1% and 0·5% increase in gum content, respectively.

* * *

Pakistan sugar industry. T. M. OZIL. *Sugar y Azúcar*, 1967, **62,** (4), 26, 42.—A survey is presented of the West and East Pakistan sugar industries with information on cane and sugar yields, beet yields, sugar consumption and prices, and details of the East Pakistan Industrial Development Corp. which has aimed at making East Pakistan self-sufficient in sugar by 1970.

* * *

Clarification of freeze-damaged and stale cane. J. J. SEIP. *Sugar J.* (La.), 1967, **29,** (10), 15–19.—Of four clarification processes studied at Louisiana State University, addition of SO_2 to the juice before liming proved to be the most efficient in regard to juice clarity and mud volume, while also giving a reasonably workable massecuite. Addition of phosphoric acid was less effective, although the juice clarity was still good, while hot liming proved slightly better than cold liming, which is the standard method used in Louisiana sugar factories (the juice is heated after liming and then settled). Juice clarity and mud volume are considered inadequate for defining clarification response, since there are also such factors as evaporator scaling and the starch content of raw sugar to take into account. Flexibility at the clarification station is considered essential where there is wide variation in cane variety, maturity, trash and tops content, as well as cane deterioration. It is recommended that provisions should be available for sampling the hot limed juice entering the clarifiers.

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Tumbler drum for removing leaf trash. B. J. COCHRAN and A. STEEN. *Sugar J.* (La.), 1967, **29,** (10), 39–41. An experimental cane cleaner at C. S. Steen Syrup Mill Inc. in Louisiana gave a cane trash content of less than 3% (expressed as a cane weight loss of 16·2%) at a throughput of approx. 20 tons of clean cane per hr. The cleaner consisted of an 8-ft dia. drum 50 ft long rotating at 14 r.p.m. The cane was conveyed along the drum by means of flights welded to form a spiral, pockets among the flights catching the cane and carrying it to the top of the drum, whence it fell and knocked other cane as well as the side of

the drum, thereby increasing the trash removal effect. Air suction was provided by fans located at the cane feed end and removed flags, mud, grass, etc. At a cane throughput of 10 tons/hr very little air was required to separate the trash, but with higher throughputs the air requirements increased significantly. Indications are that the amount of trash separated will be greater with wet leaf than with dry leaf cane, the wet leaves not having any adverse effect on cleaner performance.

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Filtration of clarifier juice. J. M. KINABREW. *Sugar J.* (La.), 1927, **29,** (10), 44–45.—Further tests with a Hayward filter[1] are described. Clarified juice passed through the filter gave a syrup of slightly lower purity and slightly higher Brix than syrup made from unfiltered juice, but the raw sugar made from the filtered juice syrup had a pol of 98·2, an ash content of 0·524% and a considerably higher filtrability than did the raw sugar from unfiltered juice syrup, which had a pol of 97 and an ash content of 0·635%. When washed, the sugars had pol values of 99·2 (from filtered juice) and 97·4 (from unfiltered juice). The advantages of the Hayward filter are enumerated.

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Bulk cane handling at Leighton factory. I. E. LEGENDRE. *Sugar J.* (La.), 1967, **29,** (10), 47–48.—The system incorporates "chain-net" dumping, an existing steam derrick being used to transfer the tractor-drawn cane carts (two per tractor) to an inclined side feeder table, where the cane is discharged to a faster moving table, and the mat thinned out and washed before being passed to the main cane carrier. This system feeds cane to the mill at 225 tons/hr, two carts (each carrying more than 4 tons of cane) being unloaded per min. Trailer-loaded cane is discharged from modified trailers in the same way, the entire load rolling out of the trailers when the spreader bar, to which one end of the chain net is welded, is lifted. The trailers are divided into two compartments, each of which contains an average of 12 tons of cane. An overhead travelling crane feeds the cane into the mill from one of five bays, into which cane is dumped by an electric hoist. Advantages of the system include labour cost reduction and an increase in the mill grinding capacity.

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"Autocane" system at Valentine factory (during the) 1966 crop. F. L. BARKER and H. P. DORMAN. *Sugar J.* (La.), 1967, **29,** (10), 55–60.—A description is given of the Edwards Engineering Corp. "Autocane" system of cane carrier control at Valentine sugar factory. On the basis of results obtained in 1966, when the system was first used, the "Autocane" is expected to increase the normal grinding capacity by 10% and extraction by 0·5%, with a reduction in maceration water. The labour force will be reduced by two carrier operators per shift, and the system will eliminate blockages at the cane knives, shredder and crusher, while improving shredder operation and cane preparation.

* * *

The modern spirit in Ingenio Xicotencatl. ANON. *Bol. Azuc. Mex.*, 1966, (210), 30–34.—A brief illustrated description is given of the cane reception and milling equipment, steam distribution, clarification house, evaporator, pan station, crystallizers and centrifugals, and of the refinery, as well as of general services at this Mexican sugar factory.

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Effects of massecuite reheating on crystal re-solution and centrifugal performance. J. C. CHOU. *Taiwan Sugar*, 1967, **14,** (1), 8–11.—Tests, in which massecuite cooled to 40–44°C was reheated to 2·5°C, 5·0°C, 7·5°C and 10·0°C above its temperature when cooled, showed a slight rise in molasses purity; this increase rose with reheat temperature, e.g. from 0·24 at 2·5°C to 0·69 at 10·0°C. The purity rise at 10·0°C reheat was almost equal whether resistance or water heating was used, but at 5·0°C reheat the former gave a higher purity rise. The range of purity rises was greater at higher reheat temperatures. However, the purity rises had little effect on sugar recovery, while on the other hand the pol increase ranged from 1·56 at 2·5°C reheat temperature to 3·13 at 10·0°C, this increase being attributed mainly to the reduction in the quantity of molasses adhering to the sugar crystals. This molasses quantity fell by 17·28% at 5·0°C reheat temperature to 26·70% at 10·0°C. The loss in crystal weight due to re-solution was found to be negligible.

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Ingenio El Mante; 27 years of progress. ANON. *Bol. Azuc. Mex.*, 1967, (211), 28–32.—A brief illustrated account is given of the factory equipment installed at El Mante sugar factory in Mexico.

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Mechanized feed table design. J. COPES. *Sugar J.* (La.), 1967, **29,** (11), 13–15.—Various factors to be considered when designing a cane feed table and washing unit are discussed, viz.: cane mat thickness, table width and required feed chain speed, water requirements (g.p.m.), table length and inclination, height of table walls, and power requirements. These and other items are discussed with reference to the 3000–4000 t.c.d. feed table installed by Thomson Machinery Co. Inc. at Valentine Sugars Inc. in Louisiana.

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Sugar in Nigeria. ANON. *Standard Bank Review*, 1967, (April), 2–4.—Information is given on the Bacita sugar estate and factory operated by the Nigerian Sugar Co. in the Ilorin province of Northern Nigeria and which was expected to produce 21,000 tons of white sugar in 1966/67. Built by Fletcher and Stewart Ltd., the factory has a capacity of 2000 t.c.d. (with provision for doubling this). The estate township and the original Bacita village together have

[1] *See I.S.J.*, 1967, **69,** 144.

a population of 15,000. Plans are well advanced for a yeast plant and a distillery at Bacita, while a bagasse pulp plant has been planned for the recently completed Jebba paper mill. It is intended to increase the cane area from 6100 acres in 1966/67 to an acreage sufficient to provide cane equivalent to 30,000 tons of refined sugar per year.

* * *

The potential of digital computers in sugar factory operations. H. R. COOPER. *Sugar News*, 1967, **43**, 75–80.—The use of computer control is discussed generally and the principal functions of an on-line computer system considered under four headings: factory process information fed to a central point where trends and process data are collected, abnormal conditions detected and laboratory analytical data converted to a useful form; factory central control; management control, involving the use of process data bearing on factory economics in order to optimize processes; and overall transmission and collection of data at the head office of a group for policy decisions. Applications of economic control and optimization in a cane sugar factory are described and brief mention is made of the management and operating control system installed at the Empire State Sugar Co. to process commercial data, collect factory process data and monitor beet pile temperatures through closed-loop scanning and control.

* * *

Future trends in our industry. J. R. ALLEN. *Proc. 34th Conf. Queensland Soc. Sugar Cane Tech.*, 1967, 11–16.—A number of problems facing the Australian sugar industry but which can be solved by planning in advance are discussed. They include the level of capital to invest in factory plant and level of production, both factors being governed by the price of sugar; development of established process methods, particular mention being made of cane diffusion; cost of sugar production, which is governed by a number of uncontrollable factors as well as other factors such as cane harvesting and transporting method, whether milling or diffusion should be used, capital and maintenance costs, etc.; new planning and management "tools", such as the critical path analysis method, which is explained with the aid of an example; and staffing of the industry.

* * *

University chemical engineering education and the raw sugar industry. R. G. H. PRINCE. *Proc. 34th Conf. Queensland Soc. Sugar Cane Tech.*, 1967, 17–23. Some aspects of the work of the Chemical Engineering Dept. of the University of Queensland which are of special interest to the raw sugar industry are considered. The advantages of a general chemical engineering course instead of courses in industrial chemistry and sugar technology, which have been abolished at Queensland University, are discussed as are the two main objections to the general course. The problems concerned with finding sufficient chemical engineering graduates for the sugar industry are considered, and suggestions offered on ways of increasing recruitment. In this connexion, the advantages and disadvantages of the bonded cadetship system are discussed. Mention is made of post-graduate work at the Chemical Engineering Dept. Although the advanced courses offered are of a general nature, examples are given of projects of a specific nature connected with the sugar industry. It is pointed out that there are certain problems which should not be tackled by post-graduates, and these are being given to appointed graduate research officers who will do the work as full-time jobs under the supervision of the Department's staff.

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Some factors influencing recovery of sugar. R. O. PETERSEN and J. K. GAUNT. *Proc. 34th Conf. Queensland Soc. Sugar Cane Tech.*, 1967, 39–42.—The two factors of prime importance considered are: the period of maximum sugar content in the cane (expressed as c.c.s.), and the effect of rainfall on the c.c.s. Since in Queensland the c.c.s. increases from June to a maximum in October, after which it falls sharply, it is considered beneficial to shorten the crushing season to the period corresponding to the maximum total c.c.s., i.e. 120 or 150 days between August and December, a period of relatively low rainfall in Queensland. Suspension of operations during any wet periods is also advocated, and it is considered that adoption of the two measures would raise the sugar recovery from the total crop by 1–2 units of c.c.s., 1 unit of c.c.s. corresponding to 150,000 tons of sugar in Australia. However, the crushing season could only be shortened without any significant expansion in milling capacity by reducing shut-downs for cleaning, extending the period between them to 10–14 days, and omitting regular weekend shut-downs. Should rain fall during the inter-shut-down period or a breakdown occur, the opportunity should be taken to clean up and the next scheduled shut-down omitted. Other factors involved in continuous working are mentioned, and the advantages of increasing sugar recovery are weighed against the difficulties and extra costs of continuous mill operation.

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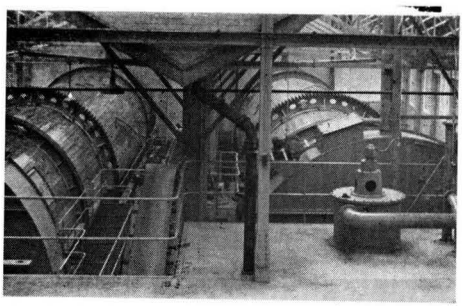
Are mill staff adequately trained for our technology? G. M. JORGENSEN and S. C. GRIMLEY. *Proc. 34th Conf. Queensland Soc. Sugar Cane Tech.*, 1967, 69–72.—The training of personnel for the Australian sugar industry is divided into two sections: formal and informal. The formal training courses cover chemistry, engineering, agriculture, office work and general. The informal training discussed covers newly appointed personnel as well as existing, and particularly junior, employees. The incentives offered at Mossman sugar factory to encourage formal studies are mentioned, and a course in basic sugar technology is called for, as is a course designed specifically for cane inspectors.



Beet sugar manufacture

Use of artificial massecuite as footing for various boiling points. F. PITTALUGA. *Ind. Sacc. Ital.*, 1967, **60**, 24–29.—After indicating how to obtain artificial massecuites (magmas) of good characteristics for use as footing, the author gives examples of the easy calculation of the quantities required in relation to the dimensions of the seed crystals and the final desired size of sugar crystal. He reviews the advantages of using such magmas, including easy boiling, more regular grain with higher recovery in the centrifugals, reduced boiling time, and less steam usage.

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Factory control of the alkalinity of defecation juices and calculation of milk-of-lime addition for purification with recirculation of 1st carbonatation muddy juice. R. OSVALD and J. FORMAN. *Listy Cukr.*, 1967, **83**, 81–85.—Equations are derived for calculation of the total quantity of milk-of-lime to be added at predefecation where 1st carbonatation juice is being recycled, and for calculating the amount of juice recycled to predefecation. The expressions are obtained from acid titration analyses of disperse systems of mixtures in pre- or main liming tanks and of recirculated juice, and involve four factors: the $CaCO_3$ contents in recycled juice and limed juice, respectively, and the CaO contents in filtered recirculated juice and in limed juice, respectively. Both conventional carbonatation (separate liming and gassing) and simultaneous carbonatation are considered.

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Comparison of 2nd saturation juice purities achieved by carbonatation and phosphate treatment respectively. R. CAROLAN. *Irish Sugar Co. Ltd. Research & Dev. Dept. Rpt.*, 1967, (190), 9 pp.—Pilot-plant experiments showed that conventional carbonatation gave thin juice purities 0·3–3·5 units lower than did phosphatation (replacement of CO_2 with phosphoric acid)[1]. Hot liming (at 88°C) before phosphatation gave similar results to cold liming (at room temperature), the average purities for cold liming + phosphatation, hot liming + phosphatation and hot liming + carbonatation being 95·4, 95·8 and 94·3, respectively, although purities exceeding 98·0 were obtained in replicate tests. Similar high purities have been found by the Irish Agricultural Institute using the phosphoric acid method. It was confirmed that the phosphated juice was almost colourless, and the connexion between the purity rise and the decolorizing effect of phosphoric acid is to be considered in the light of the finding of PREY[2] that removal of high molecular N compounds (peptide condensation products and colouring matter) gave rise to large increases in purity. While PREY's work was concerned with decolorization by ion exchange resins, the mechanism of phosphatation is similarly one of absorption.

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Determination of the qualitative effect of massecuite spinning. I. Theoretical formulation. II. Practical understanding of the problem. K. WAGNEROWSKI and C. DABROWSKI. *Gaz. Cukr.*, 1967, **75**, 53–58, 77–84. The effect of massecuite curing in centrifugals on yellow sugar quality (as represented by mother liquor content) is discussed in terms of various parameters pertaining to curing: sugar crystal size (S) (surface area of 1 g of crystal), density (d), viscosity (η), surface tension of the mother liquor (σ), sugar layer thickness (l), length of cycle (t) and centrifugal force (F). The effect of mother liquor content and quality on yellow sugar quality, as expressed by apparent Brix, purity, and colour content, is discussed and formulae derived for calculation of the various relationships. The mother syrup content is given by

$$z = S\left(k\sqrt{\frac{\eta}{Ft}\frac{ld}{}} + \frac{\sigma}{10^3 lF}\right)$$

where k = coefficient of proportionality, which has been determined from experimental data, so that the results of the calculations are not affected by factors impossible to calculate, e.g. crystal heterogeneity, effect of cooling, and partial evaporation of the syrup on the surface of the cured sugar. The effects of the individual parameters on 3rd product yellow sugar are given in graph form.

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Calcium trisaccharate obtained hot and cold. A. A. GERASIMENKO, G. S. TRET'YAKOVA, P. V. GOLOVIN, L. S. PETRENKO and N. D. SEMENYUK. *Sbornik Pishchev. Prom.*, 1966, (3), 40–48.—Tests on cold separation of calcium trisaccharate were carried out under varying conditions, in which known quantities of lime were added to saccharate and sugar solutions containing known amounts of sugar. The results showed that the precipitates were of varying composition according to conditions, increase in the

[1] CARRUTHERS & OLDFIELD: *I.S.J.*, 1961, **63**, 72–74.
[2] "The technological value of the sugar beet." *Proc. 11th Session C.I.T.S.*, 1960 (Elsevier, Amsterdam) 1962, pp. 283–290.

amount of lime added causing increase in the quantity of excess lime in the trisaccharate as well as resulting in higher sucrose recovery. Pure calcium trisaccharate having a constant lime:sucrose ratio of 3:1 was precipitated from aqueous alcohol sucrose solutions. This trisaccharate had the same specific rotation ($[\alpha]_D^{20°} = +37{\cdot}4$) as calcium trisaccharate precipitated by a hot method, details of which are given.

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The behaviour of certain nitrogenous non-sugars in purification and concentration of beet juice. L. V. ZAGAIKEVICH and I. M. LITVAK. *Sbornik Pishchev. Prom.*, 1966, (3), 77–84.—The literature on the behaviour of nitrogenous non-sugars during diffusion, carbonatation and evaporation is reviewed and a call made for more study of certain subjects, such as the conditions and extent of conversion of glutamic acid and glutamine into pyrrolidone carboxylic acid, the extent of adsorption of nitrogenous substances during carbonatation and the decomposition of amides during carbonatation and evaporation.

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Choice of downtake cross-section area in evaporators. N. YU. TOBILEVICH, I. I. SAGAN' and B. A. MATVIENKO. *Sbornik Pishchev. Prom.*, 1966, (3), 169–180.—A method of calculating the optimum cross-section area of evaporator downtakes under varying hydrodynamic and thermal conditions is presented. The calculations show that at very low values of the ratio between cross-section areas of the downtake and the boiling tubes, once an optimum height of juice above the calandria is attained it is possible to prevent increase in the juice height resulting from expansion of the boiling juice. On the other hand, if the evaporator is operated at high juice levels and circulation rates, then the downtake cross-section area must be increased considerably. Also, occurrence of local circulation areas can be prevented by allowing the juice to expand to a level above the upper tube plate sufficient to reduce the risk of down flow in the boiling tubes. Under these circumstances, once the cross-section area of the downtake has been calculated, it is necessary to check the tube circuit for the probability of down flow under given conditions. The calculations show that over- or under-heating of the juice by 5–10°C has practically no effect on circulation.

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Experimental determination of the mass transfer coefficient in a KDA-58 continuous diffuser. A. P. VERKHOLA and V. M. LYSYANSKII. *Sbornik Pishchev. Prom.*, 1966, (3), 205–211.—The use of porous glass plates 20 mm in diameter with pore diameters up to 10μ to determine the mass transfer coefficients in a KDA-58 tower diffuser is described. The plates were mounted on transverse sections and installed in the diffuser at varying heights after being saturated with water or 20% sugar solution. Results of the tests showed that the coefficient did not undergo any essential change throughout the diffuser height.

System of automatic control of multiple-effect evaporators with developed vapour withdrawal. V. D. POPOV, V. G. TREGUB and K. A. UTKINA. *Sbornik Pishchev. Prom.*, 1966, (3), 212–220.—The system described maintains the balance between the actual and required amount of water evaporated through a two-channel pressure regulator which feeds exhaust steam to the evaporator when the required amount of water evaporated is below the true quantity, and withdraws juice vapour to a steam-jet compressor when the conditions are reversed. The period of stable evaporator operation is increased by increasing the pressure due to temperature through automatic correction to compensate for the degree of scale formation. Juice is bled off to regulate the level, permitting evaporator capacity to be balanced with the factory throughput.

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Removal of pectins during juice purification in relation to the beet condition in storage. I. A. PRIKHOD'KO. *Sbornik Pishchev. Prom.*, 1966, (4), 39–43.—Samples of stored beet were taken every 20–30 days and sliced. Juice was pressed from one part of the cossettes, while the remaining cossettes were diffused at 68–72°C. Both raw and press juice were then heated to 90°C and subjected to normal 1st and 2nd carbonatation with filtration of 1st carbonatation mud. The pectin, dry solids, colloid, non-sugars and lime salts contents, purity, colour and pH of the juices before and after carbonatation were determined for beet stored for 25, 65, 85 and 130 days. Tabulated data show that in all cases the juice deteriorated with length of storage period. On the other hand, the quantity of pectins passing from the beet into the juice depended on the storage period only to a very slight extent. There was little difference between the extent of pectin removal for the four storage periods, 30–50% being eliminated by carbonatation (calculated on furfural-forming substances), or 40–65% calculated on polygalacturonic acid.

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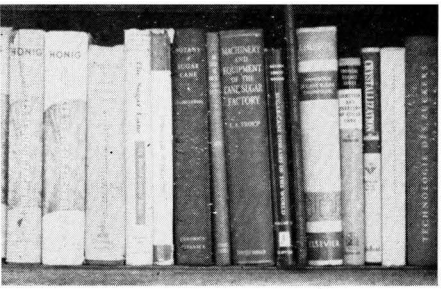
Equations of the kinetics of crystallization processes in massecuite vacuum pans and crystallizers. V. G. TREGUB and V. D. POPOV. *Sbornik Pishchev. Prom.*, 1966, (4), 71–77.—A number of equations are developed describing crystallization in pans and crystallizers in terms of the initial crystal content in the crystallizers, Kr_o, the true crystal content at a given time, Kr, and the maximum crystal content, Kr_{max} (when exhaustion of the mother liquor is complete and the saturation has dropped to unity) as well as time, τ, massecuite purity (expressed by constant n), and time at which a given relative crystal content is attained, θ. The validity of the equations is verified by a log-log graph of $\frac{1}{0{\cdot}434} \log \frac{Kr_{max} - Kr_o}{Kr_{max} - Kr}$ *vs.* τ. Straight-line curves are obtained for experimental results obtained by five authors working with massecuites of various purities and temperatures. The introduction of the term Kr_o permits examination of the inter-relationship between crystal nucleation and crystallization in pan and crystallizer.



New books

F. O. Licht's Internationales Zuckerwirtschaftliches Jahr- und Adressbuch 1967. (International sugar economic yearbook and directory 1967.) H. AHLFELD. 414 + 64 pp.; 8½ × 11½ in. (F. O. Licht KG, P.O. Box 90, 2418 Ratzeburg, Germany.) 1967. Price: DM 44.--: £4 12s 0d.

The 1967 edition of this well-known publication is now available with up-to-date information on the world's beet and cane sugar industries. The high quality of the directory is maintained and, considering the work involved in revising the information, the price is reasonable. The first section includes a decree issued by the Council of the EEC on 21st February 1967 detailing measures for the organizing of a common market for sugar in the EEC in 1967/68. Then follows a section giving information on German and other national and international sugar organizations, including scientific research institutes, and German molasses and yeast distillery associations. The third section gives names and addresses of sugar importers and exporters throughout the world, while the next three sections give information on beet and cane sugar factories and refineries throughout the world, that on West and East Germany being more detailed and including West German yeast plants. The production figures have been updated to include 1966/67. Among the cane-producing countries are seven newcomers: Cameroon, Guinea and Mali, which have established factories, Singapore, for which a refinery is planned, Iraq, for which two cane factories are planned to supplement the Mosul beet sugar factory built in 1958, and Chad and Senegal, in which the new industries are to be expanded. Three technical articles are presented; two are by H. J. DELAVIER of the Berlin Institut für Zuckerindustrie, one being a comparison between beet and cane as regards sugar production costs, yields and value of by-products, while the other concerns sugar as animal fodder. The third article, by H. LIMPRICH, covers sugar factory effluent treatment. All three articles are in German and English. A survey by H. J. DELAVIER of machinery manufacturers and construction firms serving the sugar industry (again in German and English) is followed by a series of reports from various sugar machinery manufacturers. The directory concludes with a Buyers' Guide listed by products, an English-German vocabulary of terms relating to sugar machinery, and information on a number of sugar publications, giving the publishers' addresses. The 64-page statistical supplement includes world beet and cane sugar production, imports, exports, consumption, etc., beet and sugar statistics for Germany and Europe, imports and exports in the principal importing and exporting countries, respectively, and molasses production, imports and exports. All in all, there is little to criticize, although the reviewer would like to see the countries in the English contents pages listed alphabetically (in most cases they are, but there are some wrong placements) and given the correct English spelling. The abundance of information and the excellent way in which this is presented make the book a worthwhile acquisition.

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Inversion of sucrose. 17 pp; 7×10 in. (B. W. Dyer & Co., 120 Wall Street, New York 5, N.Y., U.S.A.). 1967. Price: $2.00; 16s 8d.

The pamphlet published earlier[1] has been revised and expanded to take into account the differences in density between sucrose and invert sugar. The differences between invert and sucrose syrups are briefly discussed (the non-crystallizability and higher hygroscopicity of the former) and the uses to which they may be put are considered. The physical chemistry of sucrose inversion is also explained. A number of tables are then presented: (i) the specific gravity, weight of solids and total weight per gal of sucrose and total invert liquids at 20°/20°C *in vacuo*; (ii) the increase in solids % as a result of inversion; (iii) the specific gravity at 20°/20°C *in vacuo* per 10% inversion from sucrose to total invert; (iv) the increase in total weight per gal and increase in weight of sugar solids per gal per 10% increase in inversion from sucrose to total invert; (v) the increase in solids % and decrease in liquid sugar weight per gal at 20°C *in vacuo*; and (vi) the specific gravity, weight per gal and weight of solids per gal in air at 20°/20°C. The specific gravity tables are new additions. All the tables cover 1–80% solids.

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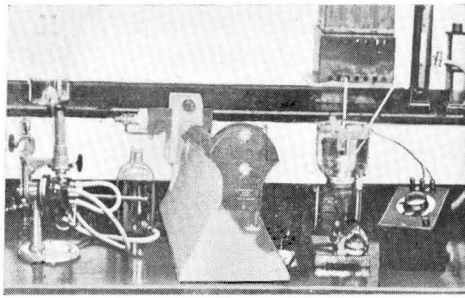
Trinidad and Tobago. 40 pp; 6×8 in. (Barclays Bank D.C.O., 54 Lombard Street, London, E.C.3.) 1967.

This is a new edition of a short economic survey of Trinidad and Tobago first published in 1965[2], the major difference lying in the updated information on production, imports, exports, etc.

[1] *I.S.J.*, 1967, **69**, 55.
[2] *ibid.*, 1965, **67**, 216.

Laboratory methods & Chemical reports



Determination of biotin in (beet) molasses. V. SYHOROVÁ. *Listy Cukr.*, 1967, **83**, 40–42.—The method described is a microbiological one involving determination of *Neurospora crassa*. The weight of the mycelium of this micro-organism is linearly proportional to the D-biotin content over the range tested. Thirty-one references are given to the literature.

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Influence of the top on the composition of the stalk and juice of sugar cane variety CB 40-13. E. R. DE OLIVEIRA, O. VALSECHI, J. P. STUPIELLO, M. A. A. CÉSAR and E. C. BRUNHARO. *Brasil Acuç.*, 1967, **69**, 45–53.—Random groups of 30 stalks of plant cane of variety CB 40–13 were taken at fortnightly intervals from a 450-sq.m. block, and divided into groups of ten stalks which were (a) complete stalks without leaves or sheaths, (b) stalks harvested normally, i.e. cut at the height of the first green leaf, and (c) stalks harvested as (b) and the next three internodes removed. The differences in weight, cane pol, juice Brix, pol, reducing sugars, purity, glucose coefficient, and available pol % cane were measured and are tabulated and discussed; the difference between (a) and (b) was 10% in respect of cane weight but insignificant in respect of available sucrose % cane. The time of harvest was an important factor affecting the cane and juice composition. It is considered that the severe fines levied by some Brazilian mills on planters who have not topped the cane low enough are not justified.

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Reduced boiling house recovery. A. C. CHATTERJEE and K. T. PILLAI. *Indian Sugar*, 1966, **16**, 677–678. The nomogram constructed by DOSS[1] for calculating reduced boiling house recovery according to the GUNDO RAO formula[2] is based on an error in that the factor K in the formula has been given as clarification factor, i.e. (non-sugar in clear juice ÷ non-sugar in mixed juice) × 100, instead of (1 — clarification factor) × 100. Examples are given to show the effect on calculation of the recovery figure.

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Direct sampling and analysis of individual cane consignments. II. Design and performance of the S.M.R.I. automatic cane sampler. E. J. BUCHANAN. *S. African Sugar J.*, 1967, **51**, 151–165.—The sampler described and illustrated includes a 2 ft square hatch in the carrier chute, covered by a pneumatically-operated door which is opened periodically, allowing a sample to fall under gravity to a continuous pre-breaker which delivers to a rotary table which provides a subsample for analysis by the cold digester mentioned earlier[3]. Analyses over a period of three months have shown that the samples are unbiased with respect to both sucrose and fibre content and the sampler is mechanically reliable. Small consistent departures from the mill balance analysis can be attributed to known errors in the mill balance and drying of cane in the mill yard. The sampler can therefore be recommended for more detailed appraisal under factory conditions with a view to future application.

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Reaction of sucrose, glucose and fructose with potassium hydroxide at various temperatures. E. S. LYGIN and S. Z. IVANOV. *Sakhar. Prom.*, 1967, **41**, (3), 23–26. Measurements of the electrolytic dissociation constant for sucrose at intervals of 10° in the range 20–90°C, for glucose and for fructose at the same temperature intervals in the range 20–70°C and 20–60°C, respectively, showed that at constant temperature sucrose is the least and fructose the most dissociated of the three sugars. The data are used to explain the autoinversion of sucrose when aqueous solutions are heated for a long period. Since the fructose and glucose molecules formed as a result of sucrose hydrolysis are more "acid" than sucrose, they increase the concentration of H^+ ions occurring as a result of water and sucrose dissociation, and thus increase further the rate of autoinversion of the sucrose. Thermal decomposition of fructose as the least stable sugar leads to formation of organic acids and increases further the concentration of H^+ ions, which act as the basic catalyst for hydrolytic decomposition of sucrose. The accelerated autoinversion thus causes considerable chemical losses of sucrose.

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The non-sucrose balance. C. M. MADRAZO, A. M. SUN and A. G. VILLALUZ. *Sugar News*, 1966, **42**, 738–742.—It is recommended that a non-sugars balance be drawn up for the boiling house as well as a sucrose balance, and it is considered that such a balance will assist chemical control of the process. A table gives details of such a balance drawn up weekly at San Carlos Milling Co. Inc., Philippines.

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Comparative results of two methods for determination of pol in filter mud. C. M. MADRAZO. *Proc. 13th Conv. Philippines Sugar Tech.*, 1965, 49–50.—The

[1] *Indian Sugar*, 1966, **16**, 255; *I.S.J.*, 1967, **69**, 151.
[2] *I.S.J.*, 1945, **47**, 263–265.
[3] *ibid.*, 1967, **69**, 281.

"official" method for determining pol in filter mud[1] was compared with a method devised by the author in which 100 g of the mud is digested with 500 g of hot water and 5 ml of 5% Na_2CO_3 for 1 hour in a boiling water bath, the extract clarified with 1 g of Horne's dry lead acetate and the filtered extract polarized. The official method employs a 25-g sample on the assumption that 1 g of insoluble material is present in the normal weight of 26 g. It is simpler than the author's method and the tests show that the results given by both may be considered identical.

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Sugar beet and purified juice quality in relation to non-sugar constituents. R. M. McCready, A. E. Goodban, R. Ratner and A. Ulrich. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 91–96.—Beets grown in the same field were selected to represent a wide range of sizes and petiole nitrate contents, and the effects on juice quality of certain non-sugars in brei prepared from the beet as well as in press juice and purified juice were determined. High correlation was found between juice purity and the negative effect of Na, (Na + K), "anions" (including pyrrolidone carboxylic acid), and total N. There was correlation also between the Na content and anion and petiole nitrate contents, between the potassium and chloride contents, and between the (Na + K) and total N contents. A high negative correlation was established between the petiole nitrate content and the beet pol. Regression equations are given for each correlation. A high positive correlation between beet sugar content and press juice refractometric dry solids suggests that for some purposes a R.D.S. measurement of press juice coupled with the regression equation would serve as an adequate measurement of beet sugar content. The regression equation defining the correlation between sugar and non-sugars contents indicated a decrease of 1 mole in the former for every 1·2 mole increase in the latter, indicating that the total solute content of press juice is relatively constant. Data obtained from beets grown in saline soils in Israel are briefly discussed and compared with the data from the U.S. beets.

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Preparation of galactinol and myoinositol from sugar beet syrup by chromatography on a cation exchange resin. R. M. McCready, J. B. Stark and A. E. Goodban. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 127–132.—Details are given of the techniques used in the isolation and crystallization of galactinol and myoinositol from an enriched beet molasses saccharate syrup. The process included fermentation with baker's yeast, destruction of the melibiose by alkaline oxidation, treatment on "Dowex 50 X8" cation exchange resin in H^+ form followed by passage through "Duolite A-4" anion exchanger in OH^- form, ion exclusion and molecular species separation on "Dowex 50W X4" ion exchanger in K^+ form, analysis of the fractions by paper chromatography, and crystallization. The chemico-physical and crystal properties of the galactinol dihydrate obtained are examined and X-ray powder data tabulated.

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A simple method for the determination of the relative concentration of total amino acids in juice expressed from sugar beet plant tissues. J. M. Fife. *J. Amer. Soc. Sugar Beet Tech.*, 1966, **14**, 133–137.—A simple colorimetric method for determining the relative concentration of total amino acids (calculated as glutamic acid) in extracts from beet plant tissue is described. It is based on reaction of the amino acids with ninhydrin on small strips of filter paper under controlled conditions, 50% ethanol being used to extract the colour for measurement of its intensity. The concentration of total amino acids in the mature leaves of a healthy beet was found to be approx. 1·6 times greater than that in the petioles, while the concentration in the crowns was about double that in the leaves. The concentration in the roots was approx. double that in the crowns, and nearly four times that in the leaves. The method gave excellent agreement between aliquots of the standard solution and juice extracted from the tissues.

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Contributions towards establishing the most adequate method for determining the technological quality of sugar beet. A. Costache, F. Domsa, M. Olaru, L. Diaconescu, A. Crusevan *et al. Lucrarile Inst. Cercetari Aliment.*, 1963–64, **7**, 105–118; through *S.I.A.*, 1967, **29**, Abs. 8.—Sugar losses in molasses as predicted from analyses of beet by the formulae of Drachovská[2], Dedek[3] and Silin[4] are compared with the losses as measured directly at three factories. All three formulae gave accurate predictions for mature beet. For immature beet the Drachovská formula predicted larger losses than did the other two.

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Crystallization and dissolution rates of sucrose in pure and impure solutions. G. Mantovani. *Zucker*, 1967, **20**, 198–204.—See *I.S.J.*, 1967, **69**, 345.

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The odoriferous components of sugar beet. H. Hoffmann and H. Hirschmüller. *Zeitsch. Zuckerind.*, 1967, **92**, 123–128, 193–200.—A survey is presented of research on odoriferous substances in beet. Vacuum distillation of press juice revealed the presence of slightly volatile carbonyl compounds which were subsequently isolated as 2,4-dinitrophenylhydrazones on an alumina column and fractionated by thin-layer chromatography, identification being made by comparison with test substances. The type of carbonyl

[1] "Official methods of chemical control for Philippine sugar factories" (Philippines Sugar Association, Manila) 1961, p. 62.
[2] *I.S.J.*, 1961, **63**, 282.
[3] Henry *et al.*: *ibid.*, 246.
[4] *ibid.*, 1962, **64**, 145.

function was determined by spectrophotometry and by a chemical procedure carried out on the thin-layer plate. The U.V. spectra of the compounds were also measured. The alcohols present in beet were also studied, being isolated from an ether extract as highly volatile esters of 4'-nitroazobenzene-4-carboxychloride. The esters were separated by thin-layer chromatography and compared with test substances. After saponification of the esters, the alcohols were separated and identified by gas chromatography, again using comparison with test substances. Analyses of the carbonyl compounds and of the alcohols are reported. Nine of each were found in the volatile components of beet. Sixty-two references are given to the literature.

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The influence of adsorbed impurities on the rate of growth and habit of sucrose crystals. A. VANHOOK. *Ind. Sacc. Ital.*, 1967, **60**, 1–6.—The tabular form of sucrose crystals grown in the presence of high concentrations of glucose or invert sugar and the acicular (needle-like) form promoted by raffinose are associated with the preferential adsorption of these impurities with respect to the axial direction. These differential adsorptions are demonstrated radio-autographically as well as by paper and thin-layer chromatography. The adsorbed glucose is restricted to the outer layers of the crystal, while raffinose is found throughout. A Langmuir-type isotherm fits the glucose case fairly well and leads to good correspondence between calculated and observed habit changes.

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Evaluation of the Stormer viscometer for determining the viscosity of sugar factory syrups. J. P. STUPIELLO and E. R. DE OLIVEIRA. *Brasil Açuc.*, 1967, **69**, (3), 58–65.—The sample is heated slightly to not higher than 50°C to eliminate air, and is added to the sample vessel. The latter is held in a bath fitted with a coil through which water flows to maintain a constant temperature. The viscosity is measured by determining the time required for 100 rotations of a 170-g drum immersed in the sample, deducting the time required for an empty vessel. The corrected time is related to the viscosity by a factor K which is determined for a range of pure sucrose syrups of 70°–75°Bx; the values of K (applicable at all temperatures) average $5{\cdot}141 \pm 0{\cdot}030$, the coefficient of variation being 2·04%.

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Amino acid composition of Torula yeast. H. C. HSIE, K. C. SU and H. C. LEE. *Rpt. Taiwan Sugar Expt. Sta.*, 1966, (43), 103–111.—Chromatographic techniques were used for quantitative and qualitative analysis of Torula yeast samples produced in 1963, 1964 and 1965. Eighteen amino acids were identified, and their contents (average of 3 years), R_f values and colour reaction to dicyclohexylamine are tabulated. They were present in the following descending order: glutamic acid > aspartic acid > lysine > alanine > leucine > valine > *iso*leucine > threonine (present in the same quantity as glycine) > arginine > serine > phenylalanine > proline > tyrosine > histidine > tryptophane > methionine > cystine. The glutamic acid content was far greater at 17·0% on protein than that of aspartic acid (9·6%), while many of the amino acids were present only in small amounts. The differences in contents of each amino acid in yeast from different years were only slight, as was the case in differences between these and other yeast samples reported in the literature.

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The rôle of the power crusher in routine cane analysis. G. N. RAO, P. K. RAO and A. D. RAO. *Indian Sugar*, 1967, **16**, 815–819.—Statistical analysis of results obtained with cane samples crushed by a laboratory mill gave the following regression equation: $X = 107{\cdot}36 - 2{\cdot}88\ Y$, where X = observed extraction % cane, and Y = calculated fibre % cane. This equation was used in analysis of further cane samples, details of which are tabulated. It was found that the formula derived by SRIVASTAVA [Sucrose % cane $= S\,(90 - F)$, where S = sucrose % juice and F = fibre % cane] gave values in fairly close agreement with true values, and is recommended in preference to other formulae which are presented.

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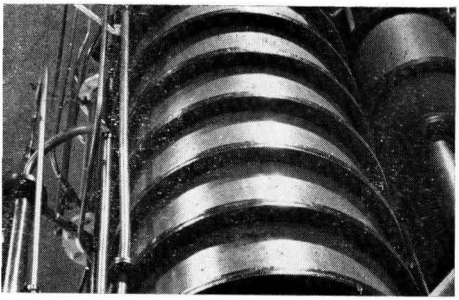
Problems of basic research in the sugar industry. V. PREY. *Zucker*, 1967, **20**, 272–282.—Research is briefly discussed under two main headings, i.e. practical and basic research, the latter being subdivided into technical and scientific research. Although juice purification has remained essentially the same chemical process since beet sugar was first produced, so that there is little than can be done in research work to improve it, it is pointed out that a suitable laboratory process is important for comparative evaluation of different thin juices. A modified form of the KRÜGER method has proved suitable. It involves heating 300 ml of press juice, diluted to 15°Bx, for 2½ min to 70°C in an agitator vessel and then adding 50 ml of milk-of-lime containing 88 g of CaO per litre. After 10 minutes' mixing at 85°C, the juice is adjusted to pH 11 with 12% phosphoric acid and agitated for a further 5 min at 85°C. After filtration, the juice is saturated to pH 8·8, agitated for 5 min at 85°C, and filtered. The need for precise measurement of invert, nitrogen and colour contents of thin juice in order to obtain an accurate determination of purification efficiency is emphasized. Spectrophotometric studies of the effect of N compounds on juice colour are discussed[1]. The determination of nitrogen as amino acids or peptide N by means of the STEIN & MOORE or "blue number" methods is described, and details given of a method for determination of "reactive" nitrogen[2].

[1] *I.S.J.*, 1967, **69**, 151.
[2] *ibid.*, 152.



By-products

Nutritive value of dry beet pulp after pressure ammoniation. S. POPPE, H. KRISTEN and R. KRAWIELITZKI. *Arch. Tierernahr.*, 1966, **16**, 255–261; through *S.I.A.*, 1966, **28**, Abs. 1085.—Pulp was treated with aqueous solutions of ammonia at 3 atm pressure for 1 hr in a semi-commercial scale apparatus. In tests with nine sheep, ammoniation to 5% NH_3 increased the raw protein content by about 70% and decreased the starch equivalent by about 24%. The digestibilities of organic substance, raw protein and N-free extract were reduced by about 20%, about 33% and about 16%, respectively. It is estimated that this method of increasing N concentration would normally be less economical than the use of urea.

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Blackstrap molasses—major economic factor in cattle operations at U.S. Sugar Corp. S. L. CROCHET. *Sugar J.* (La.), 1967, **29**, (8), 40–44.—The advantages of blackstrap molasses (as produced by the mill, with a density of 86–90°Bx) compared with cane molasses, as defined by the American Association of Feed Control Officials and recognized by the U.S. Dept. of Agriculture (blackstrap molasses diluted to approx. 79·5°Bx), are discussed and a plea made for action by sugar producers to have the former recognized by the two official bodies.

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Drying tests with carbonatation mud in a roller dryer. H. HUBER and P. GÜNTHER. *Zucker*, 1967, **20**, 143–149.—Tests at the Gross-Gerau sugar factory of Süddeutsche Zucker A.G. are described in which carbonatation mud was passed between a feed roller and a larger diameter drying roller. The wet mud was continuously fed via a trough from the rotary filter. The drying roller was heated from inside by saturated steam, and air was directed onto its outer surface from jets to prevent foaming or lifting of the mud from the hot surface, particularly when first applied. The roller speed was in the range 1·6–6·0 r.p.m. Before passing to the trough below the roller, the wet mud (containing 46–47% dry solids) was first held in a mixer tank where an agitator rotating at 1750 r.p.m. converted the mud from a doughy material to a mud. The dry solids content of the dried mud increased with lower roller speeds, but was little affected by the pressure of the heating steam. Maximum dry solids content was 97·50–97·82% at 1·6 r.p.m. The relationship between residual moisture and drying time is discussed and a nomogram given for determining the roller speed, steam pressure, and specific evaporation rate (kg/sq.m./hr) for a given residual moisture content in the mud.

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Production of itaconic acid from molasses. M. PRATES DE C. *Brasil Açuc.*, 1967, **69**, (2), 37–39.—Attention is drawn to the possibility of production of itaconic acid from Brazilian molasses, on the basis of work done in the Southern Regional Research Laboratory of the U.S. Dept. of Agriculture in New Orleans. Analysis of molasses from various Brazilian sugar factories has revealed the presence of 2·20–10·40% aconitic acid on Brix; this can be decarboxylated to itaconic acid.

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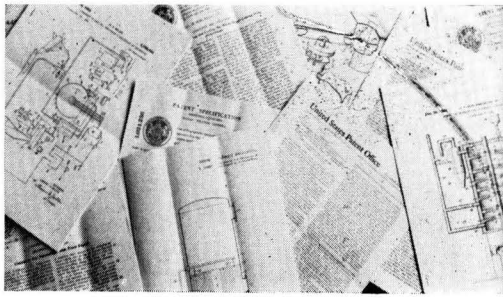
Studies on Egyptian vinasse: a project for an organic fertilizer. I. W. I. AWAD, N. E. MILAD and Y. BICHAL. *J. Chem. U.A.R.*, 1963, **6**, 181–190. II. *idem ibid.*, 1965, **8**, 109–115; through *S.I.A.*, 1967, **29**, Abs. 37, 38. I. Vinasse from Hawamdieh molasses distillery was analysed; it contained 3·04% ash (main constituents potassium and calcium) and 4·20% organic matter, including 0·51% nitrogen. Blends of vinasse (concentrated to 49°Bx), bagasse, Thomas phosphate and calcium carbonate were formulated for use as fertilizers. By substituting filter-cake for calcium carbonate, the nitrogen content was increased to 0·60%. II. Blends of vinasse (concentrated to 49°Bx), bagasse, Thomas phosphate, filter-cake, ammonium nitrate and superphosphate (55:7:17:17:4:0 and 60:6:14:4:12:4) were mixed with three Egyptian soils at rates of 2–10 g/kg, and watered daily for three weeks. Application of the fertilizer increased the water-holding capacities of the soils. The phosphorus, calcium and potassium contents of the soils increased with the level of application.

* * *

Application of ion exchangers in the Hungarian food industry. III. V. GRYLLUS and K. MAGYAR. *Elel. Ipar.*, 1966, **20**, 102–108.—See ZSIGMOND *et al.*: *I.S.J.*, 1967, **69**, 308.

Patents



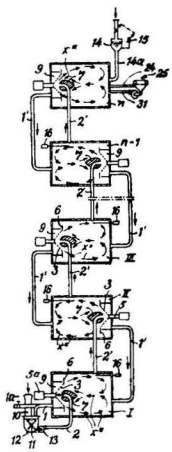
UNITED STATES

Beet topper (with deflector). N. E. WELLS, of Boise, Idaho, U.S.A. **3,257,787.** 17th February 1964; 28th June 1966.

* * *

Sugar extraction from cane or beet. K. HEINRICH, *assr.* MASCHINENFABRIK BUCKAU R. WOLF A.G., of Grevenbroich, Germany. **3,261,672.** 19th November 1962; 19th July 1966.

The diffusion device includes a series of cells, one above the other, to the top one of which is supplied extraction water through pipe 14a, while prepared cane or beet is supplied to the bottom cell I from mixer 12 through pump 13. Through the end of the



cell wall projects a shaft driven by motor 5a and carrying on its end a conical screen 3 provided with a flange 6 close to the ends of baffles and thus forming a juice compartment 9. Rotation of the screen 3 causes juice to pass through into compartment 9 while solids are directed towards the outer end (so that the screen is self-cleaned) and circulate in the direction of the arrows.

The exit of pipe 2 is coaxial with the screen 3 and is provided with a deflector 7 of circular section which aids the circulation of the solids/extraction liquid mixture. Part of this mixture is expressed (as a result of the admittance of fresh material through pipe 2) into pipe 2′ and so into cell II. Here it is directed onto the screen 3 and its liquid content separated promptly and returned to cell I through pipe 1′. The solid cane or beet material, having been partly extracted by its circulation in cell I, is then subjected to further extraction by a similar circulation in cell II and so on through the series until it is withdrawn through conduit 24 and its juice content extracted and returned to the top cell through pipe 31. The water admitted through pipe 14a replaces the dilute juice withdrawn through pipe 1′ from cell n and fed into cell n-1. This withdrawal and replacement continues through the series, the juice becoming progressively richer until the juice cell I, juice from which is withdrawn partly for adding to fresh material in mixer 12 and the remainder for process.

* * *

Producing lactic acid. K. KITAHARA, *assr.* KYOWA HAKKO KOGYO CO. LTD., of Tokyo, Japan. **3,262,862.** 6th May 1963; 26th July 1966.—D-(-)-Lactic acid is produced by culturing a *Sporolactobacillus* [*S. inulinus* nov.sp. (ATCC No. 14897)] in a medium containing a saccharide (glucose, sucrose, etc.), nitrogen source, inorganic salts, and other nutrients, whereby the saccharide is converted to lactic acid and accumulates in the medium.

* * *

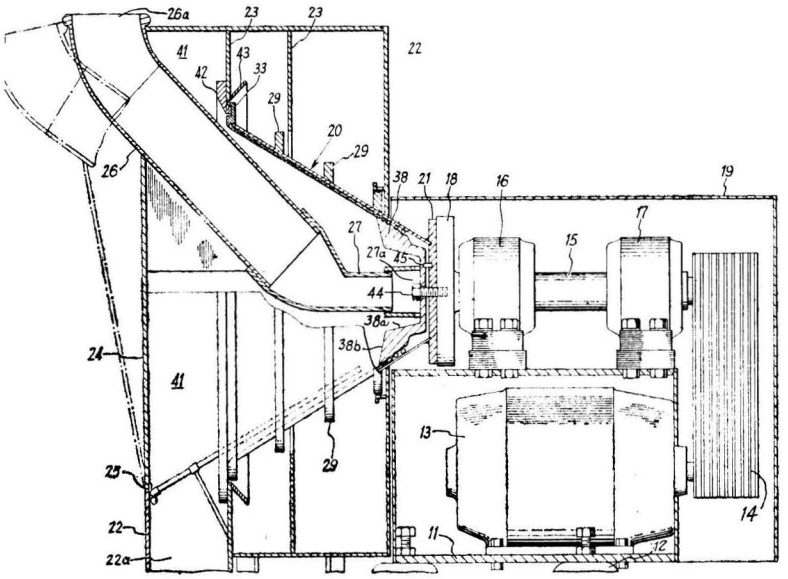
Polyurethanes prepared from a mixture of a sucrose polyether polyol and an oxyalkylated polyphenol. M. WISMER, L. R. LE BLAS and J. F. FOOTE, *assrs.* PITTSBURGH PLATE GLASS CO., of Pittsburgh, Pa., U.S.A. **3,265,641.** 16th April 1962; 9th August 1966. The polyols are suitable for reacting with an organic poly*iso*cyanate (and a chlorofluorohydrocarbon and/or water as a blowing agent) to form a polyurethane resin (or foamed resin) of superior characteristics.

* * *

Centrifugal separator. P. P. STRICH, of Cincinnati, Ohio, U.S.A. **3,269,028.** 1st October 1962; 30th August 1966.

The centrifugal embodies a frustro-conical basket rotating about a horizontal axis. The shaft 15 is mounted in bearings 16, 17 and is driven by motor 13 through belts 14. On the free end of the shaft is flange 18 to which the end plate 21 of the perforated

Copies of Specifications of United Kingdom Patents can be obtained on application to The Patent Office, Sale Branch, Block C, Station Square House, St. Mary Cray, Orpington, Kent (price 4s 6d each). United States patent specifications are obtainable from: The Commissioner of Patents, Washington, D.C. 20231 U.S.A. (price 50 cents each).



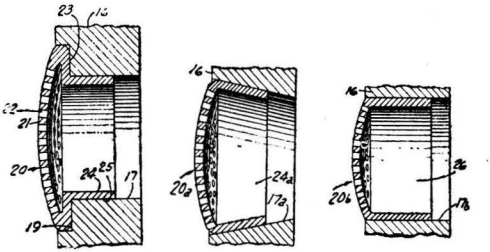
basket is attached. Surrounding the mechanisms are casings 19 and 22, braces 23 extending from the latter towards the basket. The basket is provided with supporting ribs 29 and carries three layers of screen, the innermost being a fine screen presenting a smooth flow surface. This is located at its outer end in a slot in the peripheral flange 33 and at the inner end between ribs attached to the basket and the acceleration cup 38. The massecuite is fed through the pipe combination 26, 27 which is integral with the hinged door 24; it passes from the cup 38 to the basket and is separated into molasses which passes into the housing and thence through a duct not shown. The crystals pass over the peripheral flange 33 to the chamber 41 and leave through duct 22a. The stationary flange 42 forms a labyrinth seal with flange 33, and ring 43 conducts molasses away from the periphery of the basket. The radial edges of the innermost fine screen overlap, allowing expansion as its temperature rises in use, and expansion in the perpendicular direction causes the edge to penetrate further into the slot in flange 33. For easy replacement of the screen, the door 24 and feed pipes are swung away from the cup 38 and the latter removed by unscrewing bolt 44, when the screen may be replaced. To prevent rotation of cup 38 as bolt 44 is tightened, so causing buckling of the new screen, a pin 45 is provided which locks the cup relative to plate 21. A current of heated air may be provided at right-angles to the discharged crystals so as to dry them before they are discharged from the centrifugal.

* * *

Push-type centrifugal. E. RUEGG, *assr.* ESCHER WYSS A.G., of Zurich, Switzerland. **3,268,083.** 10th May 1963; 23rd August 1966.—See U.K. Patent 1,047,434[1].

Screen plate for pulp presses. L. M. KOELSCH, *assr.* BELOIT CORPORATION, of Beloit, Wis., U.S.A. **3,270,663.** 30th November 1964; 6th September 1966.

In the conventional spindle screw press for beet pulp the expressed pulp water passes through a cylindrical liner screen supported by a cylindrical backing screen with larger apertures. Perfect contact is difficult to achieve, and deflection of the liner screen



during operation occurs, requiring replacement of the complete liner screen. To avoid this the screw is housed inside a cylinder 16 having large perforations and into each of these is inserted a plug 20, 20a or 20b having smaller perforations, so providing a robust fine screen surface.

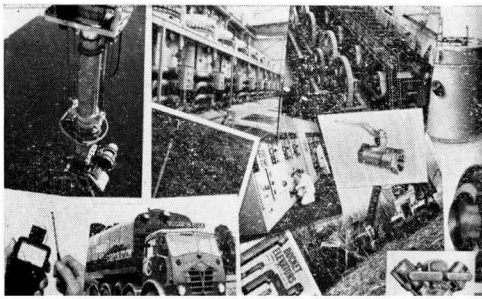
The plugs may have collars 23 to locate them, or they may be of frustro-conical shape or cylindrical, as illustrated, and they may be removed and replaced individually when necessary.

* * *

Cane planter. A. S. GONZALEZ, of Miami, Fla., U.S.A. **3,279,400.** 10th June 1964; 18th October 1966.

[1] *I.S.J.*, 1967, **69**, 153.

Trade notices



Statements published under this heading are based on information supplied by the firm or individual concerned. Literature can generally be obtained on request from the address given.

Scale cleaning chemical for sugar juice evaporators. Hodag Chemical Corporation, 7247 North Central Park Avenue, Skokie, Ill., 60076 U.S.A.

"Rapisol" is a new surface-active additive formulated for the sugar industry by Hodag Chemical Corporation. It is said to increase penetration and cleaning power when mixed with caustic cleaning solutions used for evaporators and vacuum pans. Using "Rapisol", scale deposits are rapidly removed, even the hardest calcium scale, and mechanical brushing is usually not necessary. The scale rinses off freely leaving a clean metal surface after dramatically reduced cleaning time. Acid cleaning can be eliminated for relatively light scale and considerably reduced for hard scale deposits; thus the cost of cleaning chemicals is reduced as well as their handling and storage costs. The action of "Rapisol" is through its reduction of surface tension, permitting greater penetration of the scale by the caustic solution. It is completely soluble in water, its 1% solution having a pH of 11·6. It can be added directly to the caustic storage tank or dissolved in water and drawn into the evaporators.

* * *

Flowmeter. G. A. Platon Ltd., Wella Rd., Basingstoke, Hants., England.

Among new items produced by G. A. Platon Ltd. is the "Polygapmeter", a float-type flowmeter constructed of unbreakable transparent polycarbonate plastic, which is particularly useful where glass components cannot be used.

* * *

Brushes for conveyor belts and juice screen conveyors. Schaefer Mfg. Co. Inc., 117 West Walker St., Milwaukee 4, Wisconsin, U.S.A.

The "S-VECO" conveyor belt cleaner is a unit bolted or welded into place at any point on the return side of a conveyor, being quickly adjustable through idler pulleys to any belt contour or load pattern. It incorporates an endless brush made of tufted nylon or stainless steel which travels at right-angles to the direction of the belt. The brush is mounted in double sheaves to permit positive cleaning, and is powered by a 2–5 h.p. electric motor through V-belt drive. Proper tension of the brush is ensured through a belt tightening assembly, contact between the brush and conveyor belt being maintained by height adjustment elevating screws. The brush may be replaced simply in a matter of minutes. Bulletin SV-862-5M-TJH describes the unit.

The company also manufactures juice screen conveyor brushes, which replace rubber-edged pushers and last an entire season, permitting juice to run through the screens more freely. The brushes have been tested and approved by U.S. Sugar Corp., St. James Sugar Cooperative Inc. and C. Brewer Puerto Rico Inc.

* * *

PUBLICATIONS RECEIVED

CROFTS HEAVY DUTY MACHINE CUT GEARS. Crofts (Engineers) Ltd., Thornbury, Bradford 3, Yorkshire, England

Publication No. 6612 illustrates various stages in production of a batch of cast steel double helical machine-cut open gearwheels such as used in cane mill drives. The wheels illustrated weigh 11 tons and have 114 teeth with 1 DP and 22-inch face. Other types produced include spurs, straight bevels, straight mitres, single helicals, spiral bevels, internal cut gears, worms and wheels and racks and pinions.

* * *

CONTINUOUS SUBSIDER FOR SUGAR JUICE. Stork-Werkspoor Sugar N.V., P.O. Box 147, Hengelo (O), Holland.

The Stork-Werkspoor subsider consists of an oblong rectangular container with a stepped sloping bottom and inclined flat baffle plates which direct descending particles to a central collecting sump from which the mud is removed. Clear juice is withdrawn from the highest points just below the line where the top of the baffle plates are joined to the side walls of the container. Exits at the steps permit removal of different fractions of mud as it settles from the top, centre and bottom portions of the subsider. The rectangular shape permits easy extension of the subsider by addition of further cells alongside.

* * *

"SPECTROCHEM" GRATING SPECTROPHOTOMETER. Hilger & Watts Ltd., 98 St. Pancras Way, Camden Rd., London N.W.1, England.

The range of "Spectrochem" grating spectrophotometers can now be extended to cover 340–820 mμ by use of a red-sensitive photomultiplier, and a new range of accessories now available increases the scope and versatility of the instrument. Catalogue CH 417/7 gives full information on this inexpensive instrument which is designed to fill the gap between the simple absorptiometer and a more sophisticated instrument covering the whole spectrum. It is capable of accurate routine quantitative analysis by means of a high-quality grating monochromator with a bandwidth of less than 2 mμ over most of the range and a highly-sensitive 9-stage photomultipliler as detector.

World Net Sugar Import Requirements 1968

(metric tons, raw value)

EUROPE	
Albania	21,000
Austria	0
Bulgaria	112,000
Cyprus	19,000
Finland	129,000
Germany, East	90,000
Germany, West	295,000*
Gibraltar	1,100
Greece	40,000
Iceland	10,000
Ireland	67,000
Italy	0
Malta	18,000
Netherlands & Overseas Territories	0
Norway	170,000
Portugal & Overseas Territories	18,000
Spain & Overseas Territories	192,000
Sweden	98,000
Switzerland	240,000
United Kingdom	1,982,000
USSR	1,700,000
Yugoslavia	0
	5,202,100
NORTH AMERICA	
Canada	803,000
	803,000
CENTRAL AMERICA	
Bermuda	2,000
Panama Canal Zone	2,000
	4,000
SOUTH AMERICA	
Chile	200,000
Uruguay	65,000
	265,000
ASIA	
Afghanistan	46,000
Brunei	4,000
Burma	60,000
Cambodia	25,000
Ceylon	219,000
China, Mainland	250,000
Hong Kong	110,000
Iran (*tel quel*)	150,000
Iraq	254,000
Israel	85,000
Japan	1,568,000
Jordan	50,000
Korea, North	32,000
Korea, South	130,000
Kuwait	15,000
Laos	3,000
Lebanon	42,000
Malaysia	326,000
Mongolia	20,000
Nepal	4,000
Pakistan	0
Persian Gulf	24,000
Saudi Arabia	70,000
Singapore	80,000
South Arabia, Fedn. of	43,000
Syria	91,000
Thailand (*tel quel*)	8,000
Vietnam, North	25,000
Vietnam, South	150,000
Yemen	45,000
	3,929,000

AFRICA	
Algeria	287,000
Botswana	17,000
Burundi	3,000
Cameroon	12,000
Central African Republic	4,000
Chad	20,000
Congo (Kinshasa)	10,000
Dahomey	8,000
Ethiopia	0
Gabon	2,000
Gambia	6,000
Ghana	65,000
Guinea	17,000
Ivory Coast	35,000
Kenya	90,000
Lesotho	2,000
Liberia	5,000
Libya	36,000
Malawi	0
Mali	34,000
Mauritania	25,000
Morocco	330,000
Niger	7,000
Nigeria	62,000
Rwanda	6,000
Senegal	56,000
Seychelles	2,000
Sierra Leone	25,000
Sudan	97,000
Togo	8,000
Tunisia	76,000
UAR	185,000
Upper Volta	9,000
Zambia	10,000
	1,551,000
OCEANIA	
British Oceania	3,000
New Zealand	145,000
Western Samoa	4,000
	152,000
TOTAL	11,906,100
U.S. MARKET	
US Net import requirements from foreign countries	4,125,000
GRAND TOTAL	16,031,100
3% allowance	480,000
GRAND TOTAL ROUNDED (including 3% allowance)	16,500,000

* including 217,000 metric tons for animal feeding.

Uganda sugar industry expansion[1].—Production of sugar in Uganda is expected to reach 134,000 tons in 1967 against 125,800 tons in 1966 and 115,670 tons in 1965. Most of this production is consumed in Uganda but there is a significant export trade to Kenya which in the past has taken 35,000 to 40,000 tons of sugar a year from Uganda. Further development in cane plantations is planned and the Indian Government has agreed to help in new sugar schemes. An agreement has been reached to set up a development agency on which the Indian Government and representatives of leading sugar and sugar machinery manufacturers in India will be included. The first step is the development of 21,000 acres of plantations in Bunyoro, to produce 55,000 tons of sugar yearly. Part of the area will be cultivated as a single plantation and the rest will be in the hands of groups of African farmers, organized on a cooperative basis. A similar project is envisaged at a later stage to produce 40,000 tons of sugar a year.

[1] *Financial Times*, 9th October 1967.

Brevities

French sugar marketing organization.—About twenty French sugar factories and co-operatives have united in a production and marketing organization, Sucre Union S.A. According to an announcement published in Paris, the Sucre Union S.A. which is considered to be the most important seller of French sugar in the Common Market, will have a production potential corresponding to its marketing possibilities, i.e. an annual potential of more than 400,000 metric tons. The unification enables the independent sugar factories to make use of an E.E.C. marketing organization without losing their independence.

* * *

Nigerian sugar scheme reorganization[1].—The Nigerian Sugar Co. Ltd., which started sugar growing operations in December 1964 at Bacita in Northern Nigeria, has published details of a scheme of reorganization of its capital and operations to enable it to produce sugar profitably. At the inception of the project it was expected that the first crop would produce 14,000 tons of sugar and that subsequent crops would produce 25,000 tons. But initial cultivation difficulties due to the complex of soil types at Bacita limited the first crop to just under 5000 tons of refined sugar and the two subsequent crops to 12,000 and 21,000 tons. Capital costs were also increased by the need to provide additional protection works to prevent flooding following an exceptional rise in the level of the river Oshun in 1963. The purpose of the proposed reorganization is to convert certain short and medium term debts into equity capital and to provide a three-year interest moratorium on other indebtedness. If the reorganization is implemented, the Board considers that a relatively small loss will be incurred by the Company in the current financial year and that in the absence of unforeseen circumstances the Company should begin to operate profitably in the following year. An independent agricultural expert has confirmed the Company's forecast that it should be possible to increase production progressively to the level of 31,000 tons per annum by 1971. The main markets for the Company's sugar are in the Northern States of Nigeria which are capable of absorbing the total production up to the figure indicated. It is not denied, however, that the future progress and prosperity of the Company are linked to the political and economic future of Nigeria and that the project remains vulnerable to the unforeseen hazards of tropical agriculture.

* * *

U.K. sugar surcharge decrease.—Owing to the increase of world sugar prices during recent weeks the surcharge on sugar levied by the U.K. Sugar Board has been reduced from 4d per lb (37s 4d per cwt) to 3¾d per lb (35s 0d) per cwt with effect from the 3rd November and again to 3½d per lb (30s 4d per cwt) from 23rd November 1967.

* * *

International conference on sugar consumption.—A meeting was held in Paris on 25th–26th October, organized by the Centre d'Etudes et de Documentation pour l'Utilisation du Sucre (C.E.D.U.S.) and the British Sugar Bureau. The decision to hold such a meeting had been taken at the general assembly in Athens of the Comité Européen des Fabricants de Sucre (C.E.F.S.) and was summoned to find out ways and means of practical organization and cooperation on an international level concerning all questions of sugar consumption.

* * *

Japanese sugar factory for Philippines[2].—Mitsubishi Heavy Industries Ltd. has won an order from Leyte Sugar Company in the Philippines for a 4000-ton raw sugar factory which will also produce 200 tons of refined sugar per day. The Mitsubishi company has also received orders for equipment to be used in the expansion and improvement of factories in West Pakistan, Taiwan and Okinawa.

United States Sugar Supply Quotas, 1968

	1968	1967
	(*short tons, raw value*)	
Domestic Beet	3,025,000	3,215,667
Mainland Cane	1,100,000	1,169,333
Hawaii	1,265,375	1,252,543
Puerto Rico	1,140,000	725,000
Virgin Islands	15,000	0
Total domestic areas	*6,545,375*	*6,362,543*
Philippines	1,126,020	1,126,020
Argentina	51,539	63,064
Australia	184,317	79,391
Bahamas	10,000	0
Bolivia	4,988	6,102
Brazil	418,965	512,651
British Honduras	11,264	13,378
British West Indies	154,621	183,641
Colombia	44,335	54,250
Costa Rica	49,322	60,357
Dominican Republic	418,965	618,131
Ecuador	60,961	74,591
Fiji	40,447	41,813
French West Indies	48,639	57,767
Guatemala	41,565	50,863
Haiti	23,276	28,480
Honduras	4,988	6,085
India	73,727	76,216
Ireland	5,351	5,351
Malagasy	8,703	8,997
Mauritius	16,896	17,466
Mexico	428,388	524,181
Nicaragua	49,322	52,889
Panama	31,034	32,815
Peru	334,175	408,901
Salvador	30,481	37,301
South Africa	54,270	56,103
Swaziland	6,656	6,881
Taiwan	76,799	79,391
Thailand	16,896	17,466
Venezuela	21,059	25,767
Held in reserve (for possible allocation to Rhodesia)	6,656	0
Total	10,400,000	10,800,000

South African Commission of Inquiry[9].—A Commission of Inquiry has been set up by the South African Government. It will be led by Dr. F. J. VAN BILJON and will examine: the economy, set-up, practices and management of the sugar industry; the organization of the industry; domestic and foreign marketing policy; distribution of the financial proceeds between growers and millers; the application and distribution of the financial proceeds from by-products; research by the industry; the policy for future expansion and the utilization of land outside and within recognized sugar areas; and relations and liaison of the sugar industry with the Government.

* * *

Senegal sugar factory[4].—A sugar factory is presently under construction in Nbao, the production capacity of which is to amount to 30,000 metric tons per year[5].

* * *

Beet diffusers for Italy.—Two De Smet beet diffusers are under construction in Italy for Società Italiana per l'Industria degli Zuccheri. Both are planned for installation this year. One has a daily capacity of 5000 tons of beet, expandable to 5500 tons/day, while the other has a capacity of 1600 tons day. The company building the diffusers, Cantieri Navali del Tirreno e Riuniti, of Genoa, has already built six De Smet diffusers, two of which they have supplied to Iran.

[1] *Commonwealth Producer*, 1967, (421), 107–108.
[2] *Reuters Sugar Rpt.*, 2nd October 1967.
[3] *S. African Sugar J.*, 1967, **51**, 757–761.
[4] F. O. Licht, *International Sugar Rpt.*, 1967, **99**, (30), 17.
[5] See also *I.S.J.*, 1967, **69**, 95.